

CANADA
DEPARTMENT OF MINES
MINES BRANCH

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THE
PRODUCTION OF CEMENT, LIME, CLAY PRODUCTS, STONE,
AND OTHER STRUCTURAL MATERIALS

IN

CANADA

During the Calendar Year

1910

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**ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE MINERAL
PRODUCTION OF CANADA DURING THE CALENDAR YEAR 1910.**

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

The subjects included under this heading comprise, in the order treated: cement; clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc.; lime; sand-lime brick; sands and gravels; slate; and stone for building and other purposes, including granite, marble, limestone, sandstone, etc.

The rapid growth of Canada's population, particularly in the west, and the development of industrial resources throughout the country are naturally accompanied by a greatly increased production of clay products and other structural material such as those enumerated above.

The record shows a total production of these products in 1910 valued at \$19,627,592, as compared with a value of \$16,533,349 in 1909; an increase of \$3,094,243 or 18.72 per cent.

Statistics of building permits issued in twenty-four cities representative of every province of the Dominion show a corresponding growth. The total permits for construction issued in 1910 were \$94,129,423, compared with permits of \$64,509,620 in 1909; an increase of 45.92 per cent.

A summary of the production of structural materials and clay products is shown below:—

| | 1906. | 1907. | 1908. | 1909. | 1910. |
|---------------------------------|------------|------------|------------|------------|------------|
| | \$ | \$ | \$ | \$ | \$ |
| Cement..... | 3,170,859 | 3,781,371 | 3,709,954 | 5,345,802 | 6,412,215 |
| Clay products..... | 5,072,635 | 5,772,117 | 4,500,702 | 6,450,840 | 7,629,956 |
| Lime..... | 1,009,177 | 974,595 | 712,947 | 1,132,756 | 1,137,079 |
| Sand-lime brick..... | ..... | 167,795 | 152,856 | 201,650 | 371,857 |
| Sand and gravels (exports)..... | 139,712 | 119,853 | 161,387 | 256,166 | 407,974 |
| Slate..... | 24,446 | 20,056 | 13,496 | 19,000 | 13,492 |
| Stone..... | 2,113,699 | 2,027,262 | 2,088,613 | 3,127,135 | 3,650,019 |
| Total..... | 11,530,528 | 12,863,049 | 11,339,955 | 16,533,349 | 19,627,592 |

The increase in the value of cement sales in 1910 over 1909 was 20 per cent; clay products, an increase of 18 per cent; stone, an increase of 17 per cent; sand-lime brick, an increase of 84 per cent. There was only a small increase in the production of lime and about the same production of slate. Complete statistics

of sand and gravel production are not yet collected, the figures given showing only the amounts of these products exported.

In addition to the domestic production of these structural materials there is also a considerable importation into Canada, particularly of the clay products. The imports during 1910 include cement to the value of \$468,046; clay products, \$4,331,397; lime, \$138,847; sand and gravel, \$196,766; slate, \$142,285; stone, \$845,123; or a total import valued at \$6,122,464.

CEMENT.

While the production of cement in Canada in 1910 is all classed as Portland, the output includes Puzzolan cement made at Sydney, N.S., and a "natural Portland" made at Babcock, Manitoba, located 75 miles southwest of Winnipeg on the Canadian Northern railway.

According to returns received from the manufacturers, the total quantity of cement made in Canada during 1910 was 4,396,282 barrels of 350 pounds net, as compared with 4,146,708 barrels in 1909; an increase of 249,574 barrels or 6 per cent.

The total quantity of Canadian Portland cement sold in 1910 was 4,753,975 barrels, as compared with 4,067,709 barrels in 1909; or an increase of 686,266 barrels or 16.9 per cent.

The total consumption of Portland cement in 1910, including Canadian and imported cements, was 5,103,285 barrels (of 350 pounds net), as compared with 4,209,903 barrels in 1909; or an increase of 893,382 barrels, or 21.2 per cent.

Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the following table:—

Annual Production of Cement.*

| Calendar Year. | Natural Rock Cement. | | Portland Cement. | | Totals. | |
|----------------|----------------------|---------|------------------|-----------|-----------|-----------|
| | Barrels. | Value. | Barrels. | Value. | Barrels. | Value. |
| | | \$ | | \$ | | \$ |
| 1887..... | | | | | 69,843 | 81,909 |
| 1888..... | | | | | 50,668 | 35,593 |
| 1889..... | 90,474 | 69,790 | Nil. | Nil. | 90,474 | 69,790 |
| 1890..... | 87,521 | 74,822 | 14,695 | 17,583 | 102,216 | 92,405 |
| 1891..... | 90,846 | 103,479 | 2,633 | 5,082 | 93,479 | 108,561 |
| 1892..... | 88,187 | 94,912 | 29,221 | 52,751 | 117,408 | 147,663 |
| 1893..... | 126,673 | 130,167 | 31,924 | 63,848 | 158,597 | 194,015 |
| 1894..... | 72,965 | 74,842 | 35,177 | 69,795 | 108,142 | 144,637 |
| 1895..... | 66,219 | 60,795 | 62,075 | 112,880 | 128,294 | 173,675 |
| 1896..... | 70,705 | 60,500 | 78,385 | 141,151 | 149,090 | 201,651 |
| 1897..... | 85,450 | 65,893 | 119,763 | 209,380 | 205,213 | 275,273 |
| 1898..... | 87,125 | 73,412 | 163,084 | 324,168 | 250,209 | 397,580 |
| 1899..... | 147,387 | 119,308 | 255,366 | 513,983 | 396,753 | 633,291 |
| 1900..... | 125,423 | 99,994 | 292,124 | 562,916 | 417,552 | 662,910 |
| 1901..... | 133,323 | 94,415 | 317,066 | 565,615 | 450,394 | 660,030 |
| 1902..... | 127,931 | 98,932 | 594,594 | 1,028,618 | 722,525 | 1,127,550 |
| 1903..... | 92,252 | 74,655 | 627,741 | 1,150,592 | 719,993 | 1,225,247 |
| 1904..... | 56,814 | 50,247 | 910,358 | 1,287,992 | 967,172 | 1,338,239 |
| 1905..... | 14,184 | 10,274 | 1,346,548 | 1,913,740 | 1,360,732 | 1,924,014 |
| 1906..... | 8,610 | 6,052 | 2,119,764 | 3,164,807 | 2,128,374 | 3,170,859 |
| 1907..... | 5,775 | 4,043 | 2,436,903 | 3,777,328 | 2,441,868 | 3,781,371 |
| 1908..... | 1,044 | 815 | 2,665,289 | 3,709,139 | 2,666,333 | 3,709,954 |
| 1909..... | 0 | 0 | 4,067,709 | 5,345,802 | 4,067,709 | 5,345,802 |
| 1910..... | 0 | 0 | 4,753,975 | 6,412,215 | 4,753,975 | 6,412,215 |

*Quantities sold or shipped.

The production of cement in 1910 was derived from 22 operating plants with a total daily capacity of 25,835 barrels, the operating plants being distributed as follows: one in Nova Scotia using blast furnace slag; one in Manitoba making a natural Portland cement; one in British Columbia; two in Alberta and three in Quebec using limestone and clay; and fourteen in Ontario of which eleven used marl and three limestone. The Exshaw plant was not operated during the year nor was the Point Ann plant of the Canada Cement Company, in Ontario.

A comparison of the principal cement statistics for 1909 and 1910, giving the increases or decreases, as the case may be, is shown in the next table.

**Comparison of Production, Sales, and Imports of Portland Cement in 1909
and 1910.**

| | 1909. | 1910. | Increase. | % | Decrease. | % |
|---|-----------|-----------|-----------|-------|-----------|------|
| Cement sold..... Bls. | 4,067,709 | 4,753,975 | 686,266 | 16.9 | | |
| Cement manufactured..... " | 4,146,708 | 4,396,282 | 249,574 | 6.0 | | |
| Stock on hand Jan. 1..... " | 1,098,239 | 1,189,731 | 91,492 | 8.3 | | |
| Stock on hand Dec. 31..... " | 1,177,238 | 832,038 | | | 345,200 | 29.3 |
| Value of cement sold..... \$ | 5,345,802 | 6,412,215 | 1,066,413 | 20.0 | | |
| Average price per barrel..... " | 1.31 | 1.35 | 0.04 | 3.1 | | |
| Wages paid..... " | 1,266,128 | 1,409,715 | 143,587 | 11.3 | | |
| Men employed..... No. | 2,498 | 2,220 | | | 278 | 11.1 |
| Imports of Portland cement... Bls. | 142,194 | 349,310 | 207,116 | 146.0 | | |
| Value of cement..... \$ | 166,669 | 468,046 | 301,377 | 181.0 | | |
| Average price per barrel..... " | 1.17 | 1.34 | 0.17 | 14.5 | | |
| Total consumption of cement in Canada..... Bls. | 4,209,903 | 5,103,285 | 893,382 | 21.2 | | |
| No. of completed plants operated.... | 21 | 22 | 1 | 4.8 | | |
| Total daily capacity of operating plants as on Dec. 31..... Bls. | 23,050 | 25,835 | 2,785 | 12.1 | | |

It will be observed that there was a falling off in the stock of cement on hand at the end of 1910 as compared with the stock at the end of 1909, also that there was a considerable increase in the imports of cement. The total wages paid show an increase of about 11 per cent although apparently there was at the same time a decrease in the average number of men employed; an increase of 6 per cent only is shown in the quantity of cement made, as compared with an increase of 17 per cent in the sales and an increase of 21 per cent in the consumption. Of the total quantity of cement made in 1910, 1,214,479 barrels were made from marl and 3,181,803 barrels from limestone and slag. In 1909 there were 810,706 barrels made from marl and 3,336,002 barrels made from limestone and slag, and in 1908, 1,573,090 barrels were made from marl and 1,922,871 barrels from limestone and slag.

The detailed production of cement in Ontario during 1909 and 1910 is shown in the next table and the production in all other provinces in the table following:—

Cement Production in Ontario, 1909 and 1910.

| — | | 1909. | 1910. | Increase. | % | Decrease. | % |
|---|------|-----------|-----------|-----------|------|-----------|------|
| Cement sold..... | Bls. | 2,462,027 | 2,504,650 | 42,623 | 1.7 | | |
| Cement manufactured..... | " | 2,283,263 | 2,496,200 | 212,937 | 9.3 | | |
| Stock on hand Jan. 1..... | " | 765,873 | 600,971 | | | 164,902 | 21.5 |
| Stock on hand Dec. 31..... | " | 587,109 | 592,521 | 5,412 | 0.9 | | |
| Value of cement sold..... | \$ | 3,084,218 | 3,150,479 | 66,261 | 2.2 | | |
| Wages paid..... | " | 606,639 | 743,213 | 136,574 | 22.5 | | |
| Men employed..... | No. | 1,340 | 1,306 | | | 34 | 2.5 |
| Total daily capacity of operating plants..... | Bls. | 12,450 | 15,300 | 2,850 | 22.9 | | |

Cement Production in other Provinces, 1909 and 1910.

| — | | 1909. | 1910. | Increase. | % | Decrease. | % |
|---|------|-----------|-----------|-----------|------|-----------|------|
| Cement sold..... | Bls. | 1,605,682 | 2,249,325 | 643,643 | 40.1 | | |
| Cement manufactured..... | " | 1,863,445 | 1,900,082 | 36,637 | 2.0 | | |
| Stock on hand Jan. 1..... | " | 332,366 | 588,760 | 256,394 | 77.1 | | |
| Stock on hand Dec. 31..... | " | 590,129 | 239,517 | | | 350,612 | 59.4 |
| Value of cement sold..... | \$ | 2,261,584 | 3,261,736 | 1,000,152 | 44.2 | | |
| Wages paid..... | " | 659,489 | 666,502 | 7,013 | 1.1 | | |
| Men employed..... | No. | 1,158 | 914 | | | 244 | 21.1 |
| Total daily capacity of operating plants..... | Bls. | 10,000 | 10,535 | 535 | 5.4 | | |

Statistics of the annual production of Portland cement for a number of years showing the quantity made, the quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

Annual Production of Portland Cement.

| Year. | Quantity Made. | Quantity Sold. | On hand Dec. 31. | Value of Sales. | Average per barrel. | Daily Capacity. |
|-----------|----------------|----------------|------------------|-----------------|---------------------|-----------------|
| | Barrels. | Barrels. | Barrels. | \$ | \$ cts. | Barrels. |
| 1897..... | | 119,763 | | 209,880 | 1 75 | |
| 1898..... | | 163,084 | | 324,168 | 1 99 | |
| 1899..... | | 255,366 | | 513,983 | 2 01 | |
| 1900..... | | 292,124 | | 562,916 | 1 91 | |
| 1901..... | 360,160 | 317,066 | 58,094 | 565,615 | 1 78 | |
| 1902..... | 562,335 | 594,594 | 33,446 | 1,023,618 | 1 73 | 3,900 |
| 1903..... | 714,136 | 627,741 | 128,386 | 1,150,592 | 1 83 | 4,850 |
| 1904..... | 908,990 | 910,358 | 112,051 | 1,287,992 | 1 41 | |
| 1905..... | 1,541,568 | 1,346,548 | 306,466 | 1,913,740 | 1 42 | 8,000 |
| 1906..... | 2,152,562 | 2,119,764 | 302,356 | 3,164,807 | 1 49 | 10,500 |
| 1907..... | 2,491,513 | 2,436,093 | 354,435 | 3,777,328 | 1 55 | 14,400 |
| 1908..... | 3,495,961 | 2,665,289 | 1,214,021 | 3,709,139 | 1 39 | 27,500 |
| 1909..... | 4,146,708 | 4,067,709 | 1,777,238 | 5,345,802 | 1 31 | 23,050 |
| 1910..... | 4,396,282 | 4,753,975 | 832,033 | 6,412,215 | 1 35 | 25,835 |

Imports and Exports.—There has been very little cement exported from Canada during past years. The value of the exports during 1910 was only \$12,914, as compared with a value in 1909 of \$113,362 and in 1908 of \$34,591. The quantity exported is not shown in the Customs reports.

The imports, which, previous to 1901, were larger than the Canadian production, have been decreasing since 1906, although in 1910 a considerable increase in imports is again shown. The imports in 1910 were 349,310 barrels or about 7 per cent of the total consumption, as compared with imports of 142,194 barrels in 1909 or about 3 per cent of the consumption in that year. A duty of 12½ cents per 100 pounds, equivalent to 42¾ cents per barrel of 350 pounds net, is levied on imports. The weight of the package is, however, included for purposes of duty.

The United States was the principal source of imports of cement during 1910, supplying about 43 per cent of the whole. Great Britain supplied about 35 per cent of the imports in 1910, as compared with 64 per cent in 1909.

The imports of cement during 1909 and 1910 by countries were as follows:—

Imports of Cement.

| | 1909. | | | 1910. | | |
|----------------------------|---------|-------|---------|-----------|-------|---------|
| | Cwt. | % | Value. | Cwt. | % | Value. |
| | | | \$ | | | \$ |
| Great Britain..... | 322,149 | 64.7 | 104,060 | 433,578 | 35.5 | 130,951 |
| United States..... | 145,962 | 29.3 | 51,222 | 591,403 | 48.4 | 253,463 |
| Belgium..... | 15,761 | 3.2 | 5,029 | 66,595 | 5.4 | 20,618 |
| Other countries..... | 13,806 | 2.8 | 6,358 | 131,010 | 10.7 | 63,014 |
| Totals..... | 497,678 | 100.0 | 166,669 | 1,222,586 | 100.0 | 468,046 |
| Equivalent in barrels..... | 142,194 | | | 349,310 | | |

Statistics of the exports of cement since 1891 and of the imports since 1880 are given in the next two tables:—

Exports of Cement.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|--------|----------------|--------|----------------|---------|
| | \$ | | \$ | | \$ |
| 1891..... | 2,881 | 1898..... | 2,117 | 1905..... | 3,143 |
| 1892..... | 938 | 1899..... | 2,733 | 1906..... | 7,551 |
| 1893..... | 1,172 | 1900..... | 3,296 | 1907..... | 9,618 |
| 1894..... | 482 | 1901..... | 1,514 | 1908..... | 34,591 |
| 1895..... | 937 | 1902..... | 2,287 | 1909..... | 113,362 |
| 1896..... | 1,328 | 1903..... | 2,851 | 1910..... | 12,914 |
| 1897..... | 644 | 1904..... | 5,494 | | |

Imports of Cement into Canada.

| Fiscal Year. | Cement and Mfrs. of, N.E.S.* | Hydraulic Cement. | | Portland Cement. | |
|--------------------|------------------------------------|-------------------|--------|------------------|-----------|
| | | Barrels. | Value. | Barrels. | Value. |
| | \$ | | \$ | | \$ |
| 1880..... | 28 | 10,034 | 10,306 | | 55,774 |
| 1881..... | 298 | 7,812 | 7,821 | | 45,046 |
| 1882..... | 86 | 11,945 | 13,410 | | 66,579 |
| 1883..... | 548 | 11,659 | 13,755 | | 102,537 |
| 1884..... | 1,236 | 8,606 | 9,514 | | 102,857 |
| 1885..... | 1,315 | 5,613 | 5,396 | | 111,521 |
| 1886..... | 1,851 | 6,164 | 6,028 | | 120,398 |
| 1887..... | 1,419 | 6,160 | 8,784 | 102,750 | 148,054 |
| 1888..... | 5,787 | 5,636 | 7,522 | 122,402 | 177,158 |
| 1889..... | 10,668 | 5,835 | 7,467 | 122,273 | 179,406 |
| 1890..... | 5,443 | 5,440 | 9,048 | 192,322 | 313,572 |
| 1891..... | 2,890 | 3,515 | 6,152 | 183,728 | 304,048 |
| 1892..... | 3,394 | 2,214 | 2,782 | 187,233 | 281,553 |
| 1893..... | 2,909 | 4,896 | 8,060 | 229,492 | 316,179 |
| 1894..... | 2,618 | 1,054 | 985 | 224,150 | 280,841 |
| 1895..... | 2,112 | 5,333 | 7,001 | 196,281 | 242,813 |
| 1896..... | 3,672 | 5,688 | 8,948 | 204,407 | 242,409 |
| 1897..... | 4,318 | 2,494 | 3,937 | 210,871 | 252,587 |
| | | Cwt. | | Cwt. | |
| 1898..... | 3,263 | 16,033 | 7,097 | 1,073,058 | 355,264 |
| 1899..... | 8,929 | 1,678 | 694 | 1,300,424 | 467,994 |
| 1900..... | 10,452 | 10,418 | 4,711 | 1,301,361 | 498,607 |
| 1901..... | 4,890 | 17,784 | 6,365 | 1,612,432 | 654,595 |
| 1902..... | 12,234 | 29,585 | 17,755 | 1,971,616 | 833,657 |
| 1903..... | 16,281 | 15,690 | 6,333 | 2,316,853 | 868,131 |
| 1904..... | 14,305 | 12,088 | 5,391 | 2,476,388 | 995,017 |
| 1905..... | 18,489 | 16,961 | 10,690 | 4,228,394 | 1,234,649 |
| 1906..... | 27,858 | 10,794 | 4,034 | 2,848,582 | 963,839 |
| 1907 (9 mos.)..... | 16,201 | 1,192 | 685 | 1,551,493 | 523,120 |
| 1908..... | 12,418 | 18,860 | 6,710 | 2,427,381 | 852,041 |
| 1909..... | 5,738 | 438 | 466 | 1,460,850 | 475,676 |
| 1910..... | 7,678 | 588 | 553 | 490,809 | 153,487 |

* Cement not elsewhere specified and manufactures of cement.

Consumption of Cement.—Although the exports of cement have been increasing during the past two years, the value is still comparatively small, and as the quantity has not been recorded, the consumption has been estimated on the basis of the Canadian production and the imports.

The total consumption of Portland cement in Canada, in 1910 was 5,103,285 barrels (893,075 tons), made up of: 4,753,975 barrels (831,946 tons) of Canadian cement, or 93 per cent; and 349,310 barrels (61,129 tons) of imported cement, or 7 per cent.

In 1909 the total consumption was 4,209,903 barrels (736,733 tons), of which 97 per cent was made in Canada, and 3 per cent imported.

In 1901 the total consumption was 872,966 barrels (152,769 tons), of which only 36 per cent was made in Canada, and 64 per cent was imported.

Following is an estimate of the consumption of Portland cement in Canada during the past ten years:—

Annual Consumption of Portland Cement.

| Calendar Year. | Canadian. | | Imported. | | Total. |
|----------------|-----------|----|-----------|----|-----------|
| | Barrels. | % | Barrels. | % | Barrels. |
| 1901..... | 317,066 | 36 | 555,900 | 64 | 872,966 |
| 1902..... | 594,594 | 52 | 544,954 | 48 | 1,139,548 |
| 1903..... | 627,741 | 45 | 773,678 | 55 | 1,401,419 |
| 1904..... | 910,358 | 54 | 784,630 | 46 | 1,694,988 |
| 1905..... | 1,346,548 | 59 | 918,701 | 41 | 2,265,249 |
| 1906..... | 2,119,764 | 76 | 665,845 | 24 | 2,785,609 |
| 1907..... | 2,436,093 | 78 | 672,650 | 22 | 3,108,723 |
| 1908..... | 2,665,289 | 85 | 469,049 | 15 | 3,134,338 |
| 1909..... | 4,067,709 | 97 | 142,194 | 3 | 4,209,903 |
| 1910..... | 4,753,975 | 93 | 349,310 | 7 | 5,103,285 |

Following is a list of cement manufacturing companies:—

| Name. | Location of Plant | Head Office. |
|---|---------------------------|-------------------|
| Sydney Cement Company, Ltd..... | Sydney, N.S..... | Sydney, N.S |
| Canada Cement Company, Ltd..... | | Montreal, Que. |
| Montreal Mill No. 1..... | Longue Point, Que..... | |
| Montreal Mill No. 2..... | Kilbourn Siding, Que..... | |
| International Mill..... | Hull, Que..... | |
| Owen Sound Mill..... | Shallow Lake, Ont..... | |
| Belleville Mill..... | Belleville, Ont..... | |
| Lehigh Mill..... | Belleville, Ont..... | |
| Lakefield Mill..... | Lakefield, Ont..... | |
| Marlbank Mill..... | Marlbank, Ont..... | |
| Port Colborne Mill..... | Port Colborne, Ont..... | |
| Alberta Mill..... | Calgary, Alta..... | |
| Grey and Bruce Portland Cement Co..... | Owen Sound, Ont..... | Owen Sound, Ont. |
| The Sun Portland Cement Co., Ltd. (In liquidation)..... | Owen Sound, Ont..... | Owen Sound, Ont |
| The Imperial Cement Co., Ltd..... | Owen Sound, Ont..... | Owen Sound, Ont. |
| Hanover Portland Cement Co., Ltd..... | Hanover, Ont..... | Hanover, Ont. |
| The Ontario Portland Cement Co., Ltd..... | Blue Lake, Ont..... | Brantford, Ont. |
| The National Portland Cement Co., Ltd..... | Durham, Ont..... | Durham, Ont. |
| Kirkfield Portland Cement Co., Ltd..... | Raven lake, Ont..... | Toronto, Ont. |
| Superior Portland Cement Co., Ltd..... | Orangeville, Ont..... | Orangeville, Ont. |
| The Maple Leaf Portland Cement Co., Ltd..... | Atwood, Ont..... | Listowel, Ont. |
| The Crown Portland Cement Co., Ltd..... | | Warton, Ont. |
| The Commercial Cement Co., Ltd..... | Babecock, Man..... | Winnipeg, Man. |
| The Western Canada Cement & Coal Co..... | Exshaw, Alta..... | Ottawa, Ont. |
| The Rocky Mountain Cement Co..... | Blairmore, Alta..... | Blairmore, Alta. |
| Vancouver Portland Cement Co..... | Tod inlet, B.C..... | Victoria, B.C. |

Following is a list of companies building, or contemplating the erection of mills:—

| | | |
|---|--------------------|------------------|
| Ben Allan Portland Cement Co..... | ..... | Owen Sound, Ont. |
| Lake Medal Portland Cement Co..... | ..... | Hamilton, Ont. |
| Bells Lake Portland Cement Co..... | ..... | Markdale, Ont. |
| The Brant Portland Cement Co..... | ..... | Brantford, Ont. |
| Canada Cement Co., (Quebec Mill)..... | Neuville, Que..... | Montreal, Que. |
| British Columbia Portland Cement Co.... | ..... | Princeton, B.C. |

CLAY PRODUCTS.

The clay products made in Canada comprise brick of various kinds, including common and pressed brick, paving, ornamental, and fancy brick, firebrick, porous fireproofing brick and blocks, sewerpipe, drain tile, pottery, and sanitary ware.

According to the returns received the total production of clay products in 1910 was valued at \$7,629,956, as compared with a value of \$6,450,840 in 1909; showing an increase of \$1,179,116, or 18.3 per cent.

The total value of the production in 1908 was \$4,500,702 and in 1907, \$5,772,117.

These statistics represent actual sales; material produced but held in stock over the end of the year not being included until disposed of. The annual record is now fairly complete although there are still a number of small producers who neglect to send in their returns. For the year 1910 about 438 active firms reported sales of clay products; the average number of men employed was 8,656 and total wages paid, \$3,308,609. Of the total clay products production in 1910 about 78.5 per cent was made up of building and paving brick and about 15 per cent of sewerpipe and tile.

Production of Clay Products, 1909 and 1910.

| | 1909. | | | 1910. | | |
|---|-------------|-----------|---------|-------------|-----------|---------|
| | Quantity. | Value. | Per M. | Quantity. | Value. | Per M. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Bricks— | | | | | | |
| Common..... No. | 539,228,708 | 4,212,424 | 7 81 | 627,715,319 | 5,105,354 | 8 13 |
| Pressed..... “ | 57,264,656 | 630,677 | 11 01 | 67,895,034 | 807,294 | 11 89 |
| Paving..... “ | 3,759,803 | 67,408 | 17 93 | 4,214,917 | 78,980 | 18 74 |
| Ornamental..... | | 8,366 | | 703,345 | 16,092 | 22 89 |
| Firebrick and fireclay shapes, etc..... | | 78,132 | | | 50,215 | .. |
| Fireproofing, and archi- tectural terra-cotta, etc..... | | 113,886 | | | 176,979 | |
| Pottery..... | | 285,285 | | | 250,924 | |
| Sewerpipe..... | | 645,722 | | | 774,110 | |
| Tiles, drain..... | 27,571,097 | 408,440 | 14 81 | 24,562,648 | 370,008 | |
| Totals..... | | 6,450,840 | | | 7,629,956 | |

Production of Clay Products, 1907 and 1908.

| | 1907. | | | 1908. | | |
|---|-------------|-----------|---------|-------------|-----------|---------|
| | Quantity. | Value. | Per M. | Quantity. | Value. | Per M. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Bricks— | | | | | | |
| Common..... No. | 430,015,556 | 3,455,524 | 7 87 | 353,261,268 | 2,611,554 | 7 39 |
| Pressed..... “ | 78,922,092 | 794,722 | 10 07 | 53,480,764 | 517,180 | 9 67 |
| Paving..... “ | 3,617,720 | 72,354 | 20 00 | 3,719,961 | 59,456 | 15 98 |
| Ornamental..... | | 47,288 | | | 18,535 | |
| Firebrick and fireclay shapes, etc..... | | 131,322 | | | 110,302 | |
| Fireproofing, and archi- tectural terra-cotta, etc..... | | 89,389 | | | 170,211 | |
| Pottery..... | | 253,809 | | | 200,541 | |
| Sewerpipe..... | | 667,100 | | | 514,362 | |
| Tiles, drain..... | | 260,609 | | 20,100,261 | 298,561 | 14 85 |
| Totals..... | | 5,772,117 | | | 4,500,702 | |

By provinces, the production during the past five years has been as follows:—

Production of Clay Products by Provinces, 1906-1910.

| Province. | 1906. | 1907. | 1908. | 1909. | 1910. |
|-----------------------|-----------|-----------|-----------|-----------|-----------|
| | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 160,506 | 125,560 | 117,893 | 188,185 | 204,782. |
| New Brunswick..... | 49,220 | 57,377 | 75,513 | 65,570 | 56,475 |
| Quebec..... | 769,458 | 1,214,108 | 893,717 | 1,153,832 | 1,442,842 |
| Ontario..... | 3,136,870 | 3,123,372 | 2,476,152 | 3,425,841 | 3,667,810 |
| Manitoba..... | 517,065 | 466,432 | 265,091 | 559,008 | 781,605 |
| Saskatchewan..... | 136,022 | 125,459 | 87,566 | 145,516 | 160,850 |
| Alberta..... | 180,217 | 353,672 | 240,384 | 442,486 | 753,232 |
| British Columbia..... | 123,277 | 306,137 | 344,446 | 470,402 | 562,360 |
| | 5,072,635 | 5,772,117 | 4,500,702 | 6,450,840 | 7,629,956 |

Annual Value of Production of Clay Products, 1899-1910.

| Calendar. Year. | Value. | Calendar. Year. | Value. | Calendar. Year. | Value. |
|--------------------|-----------|--------------------|-----------|--------------------|-----------|
| | \$ | | \$ | | \$ |
| 1899..... | 2,988,099 | 1903..... | 4,034,289 | 1907..... | 5,772,117 |
| 1900..... | 3,195,105 | 1904..... | 3,841,560 | 1908..... | 4,500,702 |
| 1901..... | 3,382,706 | 1905..... | 4,709,842 | 1909..... | 6,450,840 |
| 1902..... | 3,625,489 | 1906..... | 5,072,635 | 1910..... | 7,629,956 |

Exports and Imports.—The only export of clay products recorded is that of building brick, of which the exports in 1910 were 390,000 valued at \$2,762, as compared with 365,000 in 1909 valued at \$2,255, and 2,344,000 in 1908 valued at \$9,047. The imports of clay and clay products into Canada are, on the other hand, quite considerable and amounted in value during the calendar year 1910 to \$4,331,397, equivalent to about 56 per cent of the domestic production. In 1909 the imports were valued at \$3,247,539, showing an increase in 1910 of \$1,083,858 or 33.4 per cent. These imports include chiefly manufactured products, such as brick, tile, earthenware, and china of all kinds. There is also, however, quite a large importation of clays, such as the better grades of china-clay, fireclay, etc. The imports of brick and tile were valued at \$1,755,773, as compared with \$1,249,450 in 1909. Earthenware and china were imported to a value of \$2,283,116, as compared with \$1,781,759 in 1909, and clays to a value of \$292,508 in 1910, as compared with \$216,330 in 1909.

Imports of Clay Products, 1909 and 1910.

| Imports. | 12 months ending March, 1909. | 12 months ending December, 1909. | 12 months ending December, 1910. |
|---|--|---|---|
| | \$ | \$ | \$ |
| Brick and tiles— | | | |
| Bathbrick..... | 4,432 | 1,495 | 2,290 |
| Building brick..... | 103,773 | 195,360 | 274,482 |
| Paving brick..... | 101,187 | 139,366 | 124,094 |
| Firebrick of a kind not made in Canada..... | 350,457 | 485,994 | 811,027 |
| Drain tile, not glazed..... | 2,394 | 2,785 | 4,485 |
| Drain pipe, sewerpipe, etc..... | 106,399 | 170,280 | 175,599 |
| Mfgs. of clay, N.O.P..... | 141,391 | 254,170 | 361,996 |
| | 815,033 | 1,249,450 | 1,755,773 |
| Earthenware and chinaware— | | | |
| Brown coloured..... | 28,273 | 36,673 | 53,413 |
| Demijohns, churns, and crocks..... | 10,571 | 8,888 | 6,607 |
| Tableware of china, porcelain, white granite..... | 1,202,537 | 1,212,365 | 1,545,538 |
| China and porcelain..... | 87,798 | 87,467 | 95,509 |
| Tiles or blocks of..... | 43,299 | 56,974 | 90,524 |
| Earthenware tiles, N.O.P..... | 79,854 | 81,393 | 125,772 |
| Mfgs. of earthenware, N.O.P..... | 66,932 | 78,063 | 163,278 |
| Earthenware, N.O.P..... | 197,623 | 219,936 | 202,475 |
| | 1,716,887 | 1,781,759 | 2,233,116 |
| Clays— | | | |
| China-clay..... | 90,922 | 100,066 | 142,125 |
| Fireclay..... | 77,146 | 86,161 | 124,293 |
| Pipeclay..... | 887 | 310 | 114 |
| Clays, all other, N.O.P..... | 21,280 | 29,793 | 25,976 |
| | 190,235 | 216,330 | 292,508 |
| Grand total..... | 2,722,155 | 3,247,539 | 4,331,397 |

In addition to the imports shown in the above table, there is also a considerable annual importation of "chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite ground or unground," much of which is no doubt used in connexion with the manufacture of clay products. The value of these imports during the calendar year 1910 was \$121,959: of which \$90,131 was from the United States and \$29,646 from Great Britain. The value of the imports under this item during the calendar year 1909 was \$96,747. There is also an annual importation of "baths, bath tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material," the value of such imports during 1910 being \$262,667, as compared with \$211,837 during the year 1909.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and porcelain ware, white granite or ironstoneware, etc., are brought from Germany, France, Austria-Hungary, and Japan. The imports during the fiscal year, showing the country of origin, are shown in the next table. Of the brick and tile imported 74.4 per cent was from the United States and 25.5 per cent from Great Britain; and only \$607 worth from other countries. Of the earthenware and chinaware 63 per cent was imported from Great Britain; 14 per cent from the United States; 8 per cent from Germany; 6 per cent from France, and considerable values also from Japan, Austria-Hungary, and other countries. The crude clays were imported principally from Great Britain and the United States.

Imports of Clay Products during the twelve months ending March, 1910, showing Countries of Origin.

9287-3

| Imports. | Great Britain. | United States. | Germany. | France. | Austria-Hungary. | Japan. | Other Countries. | Total. |
|---|----------------|----------------|----------|---------|------------------|--------|------------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Brick and tile:— | | | | | | | | |
| Bath brick..... | 1,361 | | | | | | | 1,361 |
| Building brick..... | 21,158 | 197,017 | | | | | | 218,175 |
| Paving brick..... | 65,057 | 73,706 | | | | | | 138,763 |
| Firebrick, of a class or kind not made in Canada. | 70,705 | 448,632 | | 117 | | | | 519,454 |
| Drain tile, not glazed..... | 513 | 2,052 | | 174 | | | | 2,739 |
| Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed. | 46,228 | 149,534 | | | | | 240 | 196,002 |
| Manufactures of clay, N.O.P..... | 137,321 | 127,419 | 69 | | | 7 | | 264,816 |
| Total..... | 342,343 | 998,360 | 69 | 291 | | 7 | 240 | 1,341,310 |
| Earthenware and chinaware:— | | | | | | | | |
| Brown or coloured earthenware and stoneware, and Rockingham ware..... | 7,840 | 30,769 | 276 | 96 | 10 | | 44 | 39,035 |
| C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, N.O.P..... | 141,745 | 53,693 | 10,179 | 3,910 | 1,542 | 12,436 | 2,384 | 225,889 |
| Demijohns, churns or crocks..... | 485 | 7,021 | 7 | | | | | 7,513 |
| Tableware of china, porcelain, white granite or ironstoneware..... | 919,430 | 25,139 | 135,345 | 92,346 | 48,057 | 39,733 | 8,929 | 1,268,979 |
| China and porcelain ware, N.O.P..... | 30,580 | 11,222 | 14,145 | 8,368 | 5,574 | 22,332 | 1,538 | 98,759 |
| Tiles or blocks of earthenware or stone prepared for mosaic flooring..... | 14,100 | 47,566 | | 2,404 | | 7 | 1,082 | 65,159 |
| Earthenware tiles, N.O.P..... | 43,415 | 39,160 | | 1,405 | | | 903 | 84,883 |
| Manufacture of earthenware, N.O.P..... | 13,173 | 54,590 | 1,816 | 1,469 | 478 | 2,364 | 195 | 74,085 |
| Total..... | 1,170,768 | 269,160 | 161,768 | 109,998 | 55,661 | 76,872 | 15,075 | 1,859,302 |

Imports of Clay Products during the twelve months ending March, 1910, showing Countries of Origin.—*Continued.*

| Imports. | Great Britain. | United States. | Germany. | France. | Austria-Hungary. | Japan. | Other Countries. | Total. |
|---|----------------|----------------|----------|---------|------------------|--------|------------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Clays— | | | | | | | | |
| China-clay, ground or unground..... | 76,672 | 23,433 | | | | | 902 | 101,007 |
| Fireclay, ground or unground..... | 20,535 | 65,155 | 173 | 88 | | | 200 | 86,151 |
| Pipeclay, ground or unground..... | 151 | 52 | | | | | | 203 |
| Clays, all other, N.O.P..... | 2,958 | 27,373 | | | | | 40 | 30,871 |
| Total..... | 100,316 | 116,513 | 173 | 88 | | | 1,142 | 218,232 |
| Grand total..... | 1,613,427 | 1,384,033 | 166,010 | 110,377 | 55,661 | 76,879 | 16,457 | 3,418,844 |
| Per cent of total..... | 47.19 | 40.48 | 4.74 | 3.23 | 1.63 | 2.25 | 0.48 | 100.00 |
| Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material. | 31,611 | 198,567 | 65 | 10 | | | 4 | 230,257 |
| Chalk, china or cornwall stone, cliff stone, and feld- spar, fluorspar, magnesite, ground or unground. | 16,842 | 92,418 | 126 | 170 | 201 | | 952 | 110,709 |

A record of the total annual value of the imports of clay products since 1900 is shown in the next table. In eleven years Canada has imported clay products to the value of \$25,500,738. The increase in imports has been most pronounced in the case of brick and tile, the imports of which in 1900 amounted to \$145,914, as compared with \$1,341,310 in 1910. The imports of earthenware and china-ware, and of clays have nearly doubled in the same time.

Imports of Clay Products (total value) 1900-10.

| Fiscal Year. | Brick and Tile. | Earthenware and Chinaware. | Clays. | Total. |
|--------------|-----------------|----------------------------|-----------|------------|
| | \$ | \$ | \$ | \$ |
| 1900..... | 145,914 | 959,526 | 122,965 | 1,228,405 |
| 1901..... | 133,343 | 1,114,677 | 141,251 | 1,389,271 |
| 1902..... | 172,281 | 1,275,093 | 140,521 | 1,587,895 |
| 1903..... | 157,783 | 1,406,610 | 176,416 | 1,740,809 |
| 1904..... | 259,421 | 1,611,356 | 144,706 | 2,015,483 |
| 1905..... | 761,756** | 1,636,214 | 176,805 | 2,574,775 |
| 1906..... | 1,000,372 | 1,692,359 | 220,504 | 2,913,235 |
| 1907*..... | 770,686 | 1,422,880 | 178,240 | 2,371,806 |
| 1908..... | 1,079,556 | 2,190,784 | 267,720 | 3,538,060 |
| 1909..... | 815,033 | 1,716,887 | 190,235 | 2,722,155 |
| 1910..... | 1,341,310 | 1,859,302 | 218,232 | 3,418,844 |
| | 6,637,455 | 16,885,688 | 1,977,595 | 25,500,738 |

*9 months ending March 1907.

**Includes fireclay classified as "for use in process of manufactures."

Dr. Heinrich Ries, who is investigating the clay resources of Canada for the Geological Survey, reports with respect to the clay working industry in the western provinces: 'The main clay-working industry at the present time is the manufacture of common brick, but the product in many localities, as around Victoria and Vancouver, does not supply the entire demand, and common brick are imported in large quantities from Seattle, Washington.

'Dry-pressed brick are made in small quantities at a number of points, but the only plants of large capacity are those at Medicine Hat and Clayburn.

'Most of the pressed brick now used in the western provinces are imported, and command a high market value. The same is true of fireproofing, terra-cotta, firebrick, pottery, and sewerpipe.

'It will be seen, therefore, that there is room for abundant development and expansion in the home clay-working industries.'

Clay Building Brick.—The total production of clay building brick, including the common and pressed varieties, but excluding ornamental, paving, and firebrick, is shown by provinces for the past four years in the following tables.

In 1910 the total production was 695,610,353, valued at \$5,912,648, made up of: 627,715,319 common, valued at \$5,105,354, or an average value per thousand of \$8.13; and 67,895,034 pressed brick, valued at \$807,294, or an average value per thousand of \$11.89. There were 397 active firms reporting as compared with 386 in 1909, and the value of production shows an increase of \$1,069,547, or 22 per cent.

In 1909 the total production was 596,493,364, valued at \$4,843,101; made up of: 539,228,708 common, valued at \$4,212,424, or an average value per thousand of \$7.81; and 57,264,656 pressed brick, valued at \$630,677, or an average value per thousand of \$11.01.

In 1908, the total production was 406,742,030, valued at \$3,128,734; made up of: 353,261,268 common, valued at \$2,611,554, or an average value per thousand of \$7.39; and 53,480,764 pressed brick, valued at \$517,180, or an average value per thousand of \$9.67.

In 1907, the total production was 517,937,648, valued at \$4,250,246; made up of: 439,015,556 common, valued at \$3,455,524, or an average value per thousand of \$7.87; and 78,922,092 pressed brick, valued at \$794,722, or an average value per thousand of \$10.07.

Production of Clay Building Brick (Common and Pressed) 1909 and 1910.

| Province. | 1909. | | | | 1910. | | | |
|-----------------------|--------------------------------|-------------|-----------|--------------------------|--------------------------------|-------------|-----------|--------------------------|
| | No. of active firms reporting. | No. sold. | Value. | Per cent of total value. | No. of active firms reporting. | No. sold. | Value. | Per cent of total value. |
| | | | \$ | | | | \$ | |
| Nova Scotia..... | 12 | 18,875,000 | 114,795 | 2.37 | 15 | 18,730,000 | 113,436 | 1.92 |
| New Brunswick..... | 6 | 6,170,000 | 44,330 | 0.91 | 4 | 3,950,000 | 31,350 | 0.53 |
| Quebec..... | 54 | 101,471,567 | 690,918 | 14.27 | 62 | 130,237,310 | 929,492 | 15.72 |
| Ontario..... | 237 | 322,524,414 | 2,557,068 | 52.80 | 235 | 342,119,078 | 2,785,361 | 47.11 |
| Manitoba..... | 21 | 59,110,000 | 544,548 | 11.24 | 22 | 75,334,550 | 746,704 | 12.63 |
| Saskatchewan..... | 13 | 14,416,770 | 144,316 | 2.98 | 11 | 14,733,340 | 160,850 | 2.72 |
| Alberta..... | 28 | 45,479,855 | 441,606 | 9.12 | 29 | 73,639,771 | 750,932 | 12.70 |
| British Columbia..... | 15 | 28,445,758 | 305,520 | 6.31 | 19 | 36,316,304 | 394,473 | 6.67 |
| Totals: | 386 | 596,493,364 | 4,843,101 | 100 | 397 | 695,610,353 | 5,912,648 | 100 |

Production of Clay Building Brick (Common and Pressed) 1907 and 1908.

| Province. | 1907. | | | 1908. | | |
|-----------------------|-------------|-----------|--------------------------|-------------|-----------|--------------------------|
| | No. Sold. | Value. | Per cent of total value. | No. Sold. | Value. | Per cent of total value. |
| | | \$ | | | \$ | |
| Nova Scotia..... | 19,646,000 | 110,338 | 2.60 | 9,125,000 | 56,064 | 1.79 |
| New Brunswick..... | 4,941,141 | 36,937 | 0.87 | 6,594,011 | 54,573 | 1.74 |
| Quebec..... | 104,394,709 | 715,922 | 16.84 | 90,667,177 | 601,874 | 19.24 |
| Ontario..... | 287,930,763 | 2,311,499 | 54.38 | 221,600,575 | 1,664,184 | 53.19 |
| Manitoba..... | 45,094,130 | 465,282 | 10.95 | 26,313,000 | 254,591 | 8.14 |
| Saskatchewan..... | 12,024,070 | 125,459 | 2.95 | 3,262,996 | 87,566 | 2.80 |
| Alberta..... | 31,384,740 | 353,672 | 8.32 | 25,521,911 | 240,336 | 7.68 |
| British Columbia..... | 12,522,045 | 131,137 | 3.09 | 18,152,362 | 169,546 | 5.42 |
| Totals..... | 517,937,648 | 4,250,246 | 100.00 | 406,742,032 | 3,128,734 | 100.00 |

The production in the Maritime Provinces shows a slight falling off, although this may in part be due to incompleteness of the record, as only four firms in New Brunswick made returns in 1910 as compared with six in 1909.

The production in Quebec shows an increase of \$238,574 or 34.5 per cent; returns having been received from 62 active firms in 1910, as compared with 54 in 1909.

The Ontario production, which contributes 47 per cent of the total, shows an increase of \$228,293, or 8.9 per cent over 1909.

In the western provinces particularly, the production of building brick has greatly increased; the production in Manitoba was greater by \$202,156 or 37.1 per cent than in 1909. Saskatchewan's production was increased by \$16,534 or 11.5 per cent; that of Alberta by \$309,376 or 70.1 per cent, and of British Columbia by \$88,953 or 29.1 per cent.

The exports and imports of building brick since 1891 and 1880 respectively are shown in the two following tables. The exports have never been large, averaging for a number of years past about \$6,000 in value per annum; but falling in 1909 and 1910 to \$2,255 and \$2,762 respectively. The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value; during the past seven years, however, the value of the imports has varied from \$100,000 to over \$200,000 per annum. During the calendar year 1910, the imports were 29,049,000 brick valued at \$274,482: of which 1,993,000 valued at \$26,447, an average of \$13.27 per thousand, were imported from Great Britain; and 27,056,000 valued at \$248,035, an average of \$9.45 per thousand, from the United States. The imports during the calendar year 1909 were 27,972,000 brick, valued at \$195,360: of which 1,738,000 valued at \$21,680, an average of \$12.47 per thousand,

were imported from Great Britain; and 26,234,000 valued at \$173,680, an average of \$6.62 per thousand, from the United States.

Exports of Building Brick.

| Calendar Year. | M. | Value. | Calendar Year. | M. | Value. | Calendar Year. | M. | Value. |
|----------------|-------|--------|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ | | | \$ |
| 1891..... | 246 | 1,163 | 1898..... | 65 | 442 | 1904..... | 696 | 5,357 |
| 1892..... | 1,963 | 12,192 | 1899..... | 172 | 1,351 | 1905..... | 754 | 5,888 |
| 1893..... | 6,073 | 44,110 | 1900..... | 546 | 4,528 | 1906..... | 697 | 6,541 |
| 1894..... | 1,095 | 7,405 | 1901..... | 646 | 5,189 | 1907..... | 802 | 6,193 |
| 1895..... | 1,655 | 8,665 | 1902..... | 2,110 | 12,786 | 1908..... | 2,344 | 9,047 |
| 1896..... | 983 | 5,678 | 1903..... | 891 | 5,699 | 1909..... | 365 | 2,255 |
| 1897..... | 573 | 2,679 | | | | 1910..... | 390 | 2,762 |

Imports of Building Brick.

| Fiscal Year. | M. | Value. | Fiscal Year. | M. | Value. | Fiscal Year. | M. | Value. |
|--------------|-------|--------|--------------|-------|--------|---------------|--------|---------|
| | | \$ | | | \$ | | | \$ |
| 1880..... | 340 | 2,067 | 1891..... | 589 | 9,744 | 1902..... | 4,087 | 33,802 |
| 1881..... | 415 | 4,281 | 1892..... | 621 | 5,075 | 1903..... | 2,881 | 28,493 |
| 1882..... | 3,500 | 24,572 | 1893..... | 1,489 | 14,198 | 1904..... | 13,455 | 117,468 |
| 1883..... | 1,448 | 14,234 | 1894..... | 2,220 | 18,320 | 1905..... | 25,515 | 163,122 |
| 1884..... | 3,263 | 20,258 | 1895..... | 575 | 4,705 | 1906..... | 21,934 | 194,897 |
| 1885..... | 3,108 | 14,632 | 1896..... | 1,057 | 23,189 | 1907 (9 mos.) | 8,495 | 88,144 |
| 1886..... | 983 | 5,929 | 1897..... | 2,094 | 10,336 | 1908..... | 13,790 | 139,105 |
| 1887..... | 276 | 2,440 | 1898..... | 639 | 6,652 | 1909..... | 10,894 | 103,773 |
| 1888..... | 2,483 | 20,720 | 1899..... | 2,611 | 21,306 | 1910..... | 30,444 | 218,175 |
| 1889..... | 2,590 | 24,585 | 1900..... | 1,792 | 19,305 | | | |
| 1890..... | 1,933 | 12,500 | 1901..... | 2,800 | 20,677 | | | |

Prices.—The price of brick varies greatly with the quality, locality, market or demand; the values as given in the table of production are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1910 according to these returns was \$8.13, as compared with \$7.81 in 1909; and of pressed brick \$11.89, as compared with \$11.01 in 1909.

In the Maritime Provinces, during 1910, the price of common brick varied from \$4.80 to \$9, averaging for Nova Scotia \$5.77, and for New Brunswick \$7.83.

In Quebec the price of common brick varied between \$4 and \$10, averaging \$6.63; while the price of pressed brick averaged \$15, with only one firm reporting production. The average price of common brick in Ontario was \$7.88,

the limit of variation being \$4.70 and \$10; while for pressed brick the average was \$9.74 and the variation from \$8 to \$12.

In the western provinces the averages for common brick were fairly uniform from \$9.63 to \$9.81. In individual yards the prices varied from \$7.75 to \$12. Pressed brick in the west averaged \$16.27 per thousand in Manitoba; \$14.97 in Saskatchewan; \$19.01 in Alberta; and \$33.56 in British Columbia.

The following table shows the average values at the kilns of common and pressed brick in the several provinces during 1908, 1909, and 1910, as furnished by the producers:—

Average Prices per Thousand of Common and Pressed Brick.

| | COMMON BRICK. | | | PRESSED BRICK. | | |
|-----------------------|---------------|---------|---------|----------------|---------|---------|
| | 1908. | 1909. | 1910. | 1908. | 1909. | 1910. |
| | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. |
| Nova Scotia..... | 5 81 | 5 69 | 5 77 | 13 84 | 12 36 | 12 27 |
| New Brunswick..... | 8 17 | 7 14 | 7 83 | 16 70 | 12 00 | 12 00 |
| Quebec..... | 6 37 | 6 38 | 6 63 | 11 62 | 14 00 | 15 00 |
| Ontario..... | 7 24 | 7 71 | 7 88 | 8 74 | 9 46 | 9 74 |
| Manitoba..... | 9 24 | 9 14 | 9 81 | 15 45 | 12 00 | 16 27 |
| Saskatchewan..... | 10 46 | 9 66 | 9 63 | 11 18 | 14 00 | 14 97 |
| Alberta..... | 8 60 | 9 21 | 9 63 | 12 97 | 13 03 | 19 01 |
| British Columbia..... | 9 21 | 9 73 | 9 77 | 20 40 | 31 05 | 33 56 |
| Canada..... | 7 39 | 7 81 | 8 13 | 9 67 | 11 01 | 11 89 |

Ontario.—This Province has for a number of years past produced over 50 per cent of the clay building-brick production in Canada, though the percentage in 1910 has fallen to 47. The vicinity of the city of Toronto, including the counties of York and Halton, is the principal brick making section and in 1910 produced about 62 per cent of the Ontario production, or about 29 per cent of the total Canadian production of brick.

The district next in importance is the county of Wentworth, comprising the city of Hamilton and vicinity, producing about 6 per cent of the Ontario production. The Ottawa district, including the counties of Russell and Carleton, also produced about the same amount. Other important districts are Algoma and Nipissing, which cover a wide area, and the counties of Waterloo, Middlesex, Grey, and Kent. These eleven counties contributed over 85 per cent of the Ontario production. Practically all the pressed brick reported as such was made in the Toronto and Hamilton districts.

Production of Common and Pressed Brick by Principal Counties.

| County. | COMMON. | | | PRESSED. | | | Total Value. | Per cent. |
|------------------------|-------------|-----------|--------|------------|---------|--------|--------------|-----------|
| | No. | Value. | Per M. | No. | Value. | Per M. | | |
| | | \$ | \$ c. | | \$ | \$ c. | | |
| York..... | 157,634,189 | 1,314,153 | 8 34 | 16,773,221 | 172,183 | 10 27 | 1,486,336 | 53.36 |
| Halton..... | | | | 25,120,000 | 233,361 | 9 49 | 233,361 | 8.56 |
| Wentworth..... | 19,024,051 | 134,325 | 7 09 | 4,100,000 | 36,119 | 8 81 | 170,944 | 6.14 |
| Russell..... | 12,950,000 | 97,800 | 7 55 | | | | 97,800 | 3.51 |
| Carleton..... | 9,664,000 | 87,231 | 9 03 | | | | 87,231 | 3.13 |
| Algoma..... | 8,815,000 | 78,650 | 8 92 | | | | 78,650 | 2.83 |
| Nipissing..... | 4,700,000 | 51,000 | 10 85 | | | | 51,000 | 1.82 |
| Waterloo..... | 7,140,159 | 50,431 | 7 06 | | | | 50,431 | 1.81 |
| Middlesex..... | 5,956,150 | 43,413 | 7 29 | 30,000 | 240 | 8 00 | 43,653 | 1.57 |
| Grey..... | 6,387,000 | 41,004 | 6 42 | | | | 41,004 | 1.47 |
| Kent..... | 4,800,200 | 30,846 | 6 43 | 100,000 | 800 | 8 00 | 31,646 | 1.14 |
| Total, 11 counties.... | 237,070,749 | 1,929,353 | 8 14 | 46,123,221 | 447,703 | 9 71 | 2,377,056 | 85.34 |
| Total, other counties. | 56,362,020 | 382,004 | 6 78 | 2,563,088 | 26,301 | 10 26 | 408,305 | 14.66 |
| Total, Ontario..... | 293,432,769 | 2,311,357 | 7 88 | 48,686,309 | 474,004 | 9 74 | 2,785,361 | 100.00 |

The annual production of common and pressed brick in this Province since 1898 as ascertained by the Ontario Bureau of Mines is shown in the following table. The figures show the total quantity and value of the brick made, as distinguished from the sales given in the previous table.

Building Brick made in Ontario since 1898.

| | COMMON BRICK. | | | PRESSED BRICK. | | |
|-----------|---------------|-----------|----------------|----------------|---------|----------------|
| | M. | Value. | Average per M. | M. | Value. | Average per M. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| 1898..... | 170,000 | 914,000 | 5.376 | 8,970 | 100,344 | 11.187 |
| 1899..... | 233,898 | 1,313,750 | 5.617 | 10,808 | 105,000 | 9.715 |
| 1900..... | 240,430 | 1,379,590 | 5.738 | 11,562 | 114,419 | 9.896 |
| 1901..... | 259,265 | 1,530,460 | 5.903 | 12,846 | 104,394 | 8.127 |
| 1902..... | 220,500 | 1,411,000 | 6.399 | 19,755 | 144,171 | 7.298 |
| 1903..... | 230,000 | 1,561,700 | 6.790 | 23,703 | 218,550 | 9.220 |
| 1904..... | 200,000 | 1,430,000 | 7.150 | 26,857 | 226,750 | 8.443 |
| 1905..... | 250,000 | 1,937,500 | 7.750 | 26,000 | 234,000 | 9.000 |
| 1906..... | 300,000 | 2,157,000 | 7.190 | 39,860 | 337,795 | 8.475 |
| 1907..... | 273,882 | 2,109,978 | 7.704 | 69,763 | 648,683 | 9.298 |
| 1908..... | 222,361 | 1,575,875 | 7.087 | 56,167 | 485,819 | 8.649 |
| 1909..... | 246,308 | 1,916,147 | 7.779 | 53,167 | 490,571 | 9.227 |
| 1910..... | 304,988 | 2,374,287 | 7.785 | 44,204 | 458,596 | 10.375 |

Manitoba.—The production of building brick in Manitoba in 1910 was 75,834 thousand valued at \$746,704, as compared with 59,110 thousand valued at \$544,548; an increase of 37 per cent in the value of production.

Mr. Joseph Keele, who is associated with Dr. H. Ries in an investigation of the clay resources of Canada, reports:—

“About twenty-six brickyards are in operation in Manitoba; of these about four produce dry press bricks, and the rest, with the exception of one stiff mud machine at Alsip’s yard in Winnipeg, turn out soft mud bricks.

“The burning is most easily done in scove kilns, the fuel being generally dry poplar wood, but a few of the more progressive plants have down draft kilns and burn coal. The season’s output varies from 500,000 to 12,000,000 in the various yards, the average length of the season being about 150 days.

“The principal difficulties met with by brickmakers using surface clays are: the liability of the green brick to air check while on the drying racks, and in judging the proper degree of burning. Calcareous clays have their points of incipient vitrification and fusion so close together that quantities of the brick near the arches are melted, while the upper layers, which receive the least amount of heat, are under-burned and soft, consequently there is great waste. It seems impossible to avoid this in scove kilns, but there is far less waste, and a greater economy of fuel in down draft kilns.

“If the clay is mined in the autumn, and allowed to weather in a stockpile over winter, subsequent air checking in the drying racks will be considerably reduced, the clay will be easier to work, and it will be available for use earlier in the spring; but only in one instance that came under my notice was this method taken advantage of.

“There was a great scarcity of brick in Manitoba during the early part of the building season of 1910. No brick were left over from the season of 1909, and on June 1 there was not a kiln of brick yet burned in the Province. On the night of June 2, about 2,000,000 brick were frozen on the drying racks, and consequently destroyed.

“Common brick usually sell in Winnipeg for \$11 per thousand, but this summer they sold as high as \$15, and as the local yards were unable to supply the demand large quantities were imported. Most of the pressed brick used for facing buildings is imported.

“All the structural hollow ware and sewerpipe used in the Province is imported, but the use of paving brick is prohibited by the high freight rates on such a heavy commodity.”

Saskatchewan.—Returns from eleven operating firms show a production in 1910 of 14,733 thousand brick, valued at \$160,850, as compared with 14,417 thousand valued at \$144,316 in 1909.

The principal brick plants are located at Estevan, Prince Albert, Saskatoon, Rosthern, Verigin, and Yorkton.

Alberta.—Twenty-nine operating firms reported a production of 73,640 thousand brick valued at \$750,982, as compared with 45,480 thousand valued at \$441,606 in 1909 by twenty-eight firms; showing an increase in value of production of \$309,376 or about 70 per cent. As in the other western provinces, the production has been rapidly increasing. Several new plants were in course of construction during the year which were expected to be ready for operation during 1911. The principal centres of present production are Edmonton, Calgary, Medicine Hat, and Lethbridge.

British Columbia.—The production during 1910 by nineteen active firms was 36,316 thousand brick valued at \$394,473. These statistics include reliable estimates for two firms that did not report directly to this Department. The production by fifteen firms in 1909 was reported as 28,445 thousand brick valued at \$305,520. The average price at the yard of common brick during the year was \$9.77, while pressed brick sold at from \$20 to \$40 per thousand. Vancouver, New Westminster, Port Haney and vicinity, Victoria, and Sydney are the principal centres for the production of common brick, while pressed brick are made in considerable quantities at Clayburn.

Paving Brick.—Hitherto the only paving brick made in Canada have been those made at West Toronto from shale found on the banks of the Humber river. A beginning has, however, now been made in the manufacture of paving brick in British Columbia at Clayburn, by the Clayburn Brick Co., from shales found in Sumas mountain. The annual production in Ontario has been fairly constant at from 3,000,000 to 5,000,000 brick per season, and the output finds a market chiefly in Toronto. Statistics of production are available since 1897 and are shown in the next table; the average price per thousand has varied from \$8 to \$20.

In 1910 the number of paving brick sold was 4,215,000, valued at \$78,980, while during the same year there were imported 10,503 thousand paving brick, valued at \$124,994. These imports include: 2,786 thousand, valued at \$29,936, or \$10.75 per thousand, from the United States, and 7,717 thousand, valued at \$95,058, or \$12.32 per thousand, from Great Britain.

Annual Production of Paving Brick.*

| Year. | M. | Value. | Average per M. | Year. | M. | Value. | Average per M. |
|-----------|-------|--------|----------------|-----------|-------|--------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1897..... | 4,568 | 45,670 | 10 00 | 1904..... | 4,436 | 55,450 | 12 50 |
| 1898..... | | | | 1905..... | 4,500 | 54,000 | 12 00 |
| 1899..... | 5,300 | 42,550 | 8 03 | 1906..... | 3,000 | 45,000 | 15 00 |
| 1900..... | 2,710 | 26,950 | 9 94 | 1907..... | 3,618 | 72,354 | 20 00 |
| 1901..... | 3,689 | 37,000 | 10 03 | 1908..... | 3,720 | 59,456 | 15 98 |
| 1902..... | 4,211 | 42,000 | 9 97 | 1909..... | 3,760 | 67,408 | 17 93 |
| 1903..... | 3,789 | 45,288 | 11 95 | 1910..... | 4,215 | 78,980 | 18 74 |

(*) Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.*

| Fiscal Year. | M. | Value. | Average per M. | Fiscal Year. | M. | Value. | Average per M. |
|--------------|-------|--------|----------------|--------------------|-------|---------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1895..... | 275 | 5,006 | 18 20 | 1903..... | 1,337 | 18,811 | 14 07 |
| 1896..... | 918 | 10,132 | 11 04 | 1904..... | 1,986 | 29,753 | 14 98 |
| 1897..... | 52 | 719 | 13 83 | 1905..... | 3,350 | 32,578 | 13 86 |
| 1898..... | 367 | 2,337 | 6 37 | 1906..... | 4,104 | 46,008 | 11 21 |
| 1899..... | 1,583 | 23,648 | 14 94 | 1907 (9 mos.)..... | 2,182 | 23,256 | 10 66 |
| 1900..... | 2,175 | 35,644 | 16 39 | 1908..... | 5,340 | 61,346 | 11 49 |
| 1901..... | 900 | 10,414 | 11 57 | 1909..... | | 101,187 | † |
| 1902..... | 1,030 | 16,788 | 16 30 | 1910..... | | 138,763 | |

*Duty 20 per cent.

†The imports during July, 1908, under the general tariff, are reported as 6,581 M., value \$7,317, an apparent error. There appears also to be an error in the entries for July, August, and September of the same year. The total number has, therefore, been omitted. The actual value of the imported brick varies from \$10 to \$12 per M.

Fireclay and Fireclay Products.—There are a number of clays from different localities that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed fireclays. These include clays found with the coal measures at Westville, Nova Scotia, and at Comox, Vancouver island; also clays found south of Moosejaw, Saskatchewan, and at Clayburn, near the city of Vancouver, British Columbia. Stove lining and other refractory clay products are made at several places in Ontario and Quebec from imported fireclays.

The total value of the sales of fireclay, firebrick, and fireclay products in 1910 was \$50,215; as compared with a valuation of \$78,132 in 1909, \$110,302 in 1908, and \$131,322 in 1907.

The production in 1910 comprised 1,375,400 firebrick valued at \$29,352, or an average of \$21.34 per thousand; fireclay sold was 1,425 tons valued at \$5,863, and other fireclay products valued at \$15,000.

The production of 1909 comprised 1,059,270 firebrick valued at \$32,742, or an average of \$30.92 per thousand; fireclay sold, 4,405 tons valued at \$12,390, and other fireclay products valued at \$33,000.

Fireclay products in 1908 included 2,415,871 firebrick valued at \$70,429, an average of \$29.16 per thousand; fireclay sold, 1,984 tons valued at \$8,121, and other fireclay products valued at \$31,752. The 1907 production comprised 4,323,179 firebrick, valued at \$113,322, an average of \$26.21 per thousand; and other fireclay shapes to the value of \$18,000.

The imports of firebrick during the calendar year 1910 were valued at \$811,927: of which \$734,908 worth were imported from the United States and \$76,902 from Great Britain. Fireclay was imported during the calendar year 1910 to the value of \$124,293, as compared with a value of \$86,161 in 1909.

The following table gives a record of the imports of fireclay and firebrick since 1900, the figures being in each case for the fiscal year.

Imports of Firebrick and Fireclay, 1900-10.

| Fiscal Year. | Fireclay. | Firebrick. | Fiscal Year. | Fireclay. | Firebrick. |
|--------------|-----------|------------|--------------|-----------|------------|
| | \$ | \$ | | \$ | \$ |
| 1900..... | 59,291 | 39,535 | 1906..... | 131,130 | 51,892 |
| 1901..... | 79,530 | 32,831 | 1907*..... | 85,044 | 349,185 |
| 1902..... | 64,541 | 45,608 | 1908..... | 155,873 | 639,347 |
| 1903..... | 94,509 | 34,522 | 1909..... | 77,146 | 350,457 |
| 1904..... | 52,716 | 33,335 | 1910..... | 86,151 | 519,454 |
| 1905..... | 73,837 | 44,746 | | | |

*9 months ending March.

Sewerpipe and Drain Tile.—The total value of the sales of sewerpipe in 1910 was \$774,110; as compared with a value of \$645,722 in 1909, and a value of \$514,362 in 1908.

The imports of drain pipe and sewerpipe during the calendar year 1910 were valued at \$175,599: of which \$140,259 worth were imported from the United States, \$35,149 from Great Britain, and \$191 from other countries.

The imports of sewerpipe during the calendar year 1909 were valued at \$170,280: of which \$135,809 worth were imported from the United States, \$34,200 from Great Britain, and \$271 from other countries.

Following is a list of firms manufacturing sewerpipe:—

- Standard Drain Pipe Co. of St. Johns, Que., and New Glasgow, N.S.
- Ontario Sewerpipe Company, Toronto, Ont.
- Dominion Sewer Pipe Company, Toronto, Ont.
- Hamilton and Toronto Sewer Pipe Co., Ltd., Hamilton, Ont.
- B. C. Pottery Company, Victoria, B.C.

In addition to the above the Alberta Clay Products Company has built an extensive plant at Medicine Hat, Alberta, for the manufacture of brick, sewerpipe, and other clay products.

The production of drain tile as reported to this Branch was not as large in 1910 as during 1909. The total sales in 1910 were 24,562,648 valued at \$370,008, an increase of \$15.06 per thousand; as compared with sales of 27,571,097 valued at \$408,440, an average of \$14.81 per thousand, in 1909. The sales in 1908 were reported as 20,418,000, valued at \$298,561. The Ontario Bureau of Mines reports the total number made in that Province during 1910 as 21,028,000, valued at \$318,456, or an average of \$15.14 per thousand; as compared with 27,418,000 valued at \$363,550, or an average of \$13.25 per thousand, in 1909. The sales in Ontario during 1910, according to direct returns to this Branch, were 22,810 thousand, valued at \$334,402, or 93 per cent of the total production in Canada.

The imports of unglazed drain tile are comparatively small, the value during the calendar year 1910 being \$4,485 only, as compared with \$2,785 in 1909.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe are shown in the next three tables.

Production of Sewerpipe, etc.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------------|----------------|---------|----------------|---------|
| | \$ | | \$ | | \$ |
| 1888..... | 266,320 | 1896..... | 153,875 | 1904..... | 440,894 |
| 1889..... | Not available | 1897..... | 164,250 | 1905..... | 382,000 |
| 1890..... | 348,000 | 1898..... | 181,717 | 1906..... | 350,045 |
| 1891..... | 227,300 | 1899..... | 161,546 | 1907..... | 667,100 |
| 1892..... | 367,660 | 1900..... | 231,525 | 1908..... | 514,362 |
| 1893..... | 350,000 | 1901..... | 248,115 | 1909..... | 645,722 |
| 1894..... | 250,325 | 1902..... | 301,965 | 1910..... | 774,110 |
| 1895..... | 257,045 | 1903..... | 317,970 | | |

Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines).

| Year. | No. | Value. | Year. | No. | Value. | Year. | No. | Value. |
|----------|------------|---------|----------|------------|---------|----------|------------|---------|
| | | \$ | | | \$ | | | \$ |
| 1891.... | 7,500,000 | 90,000 | 1898.... | 22,668,000 | 225,000 | 1905.... | 15,000,000 | 220,000 |
| 1892.... | 10,000,000 | 100,000 | 1899.... | 21,027,400 | 240,246 | 1906.... | 17,700,000 | 252,500 |
| 1893.... | 17,300,000 | 190,000 | 1900.... | 19,544,000 | 209,738 | 1907.... | 15,578,000 | 250,122 |
| 1894.... | 25,000,000 | 280,000 | 1901.... | 21,592,000 | 231,374 | 1908.... | 24,800,000 | 338,658 |
| 1895.... | 14,330,000 | 157,000 | 1902.... | 17,510,000 | 199,000 | 1909.... | 27,418,000 | 363,550 |
| 1896.... | 13,200,000 | 144,000 | 1903.... | 18,200,000 | 227,000 | 1910.... | 21,028,000 | 318,456 |
| 1897.... |* |* | 1904.... | 16,000,000 | 210,000 | | | |

*Not stated.

Imports of Drain Tile and Sewerpipe.

| Fiscal Year. | Drain Tile (a) | Sewerpipe (b). | Fiscal Year. | Drain Tile (a) | Sewerpipe (b). |
|--------------|----------------|----------------|-------------------|----------------|----------------|
| | \$ | \$ | | \$ | \$ |
| 1880..... | | 33,796 | 1896..... | 330 | 18,957 |
| 1881..... | | 37,368 | 1897..... | 416 | 33,870 |
| 1882..... | | 70,061 | 1898..... | 157 | 29,454 |
| 1883..... | | 70,699 | 1899..... | 1,817 | 32,071 |
| 1884..... | 5,585 | 66,170 | 1900..... | 1,383 | 37,766 |
| 1885..... | 2,911 | 66,678 | 1901..... | 1,264 | 54,819 |
| 1886..... | 1,905 | 56,048 | 1902..... | 269 | 55,261 |
| 1887..... | 2,183 | 69,020 | 1903..... | 252 | 57,100 |
| 1888..... | 4,290 | 96,967 | 1904..... | 1,637 | 53,958 |
| 1889..... | 2,346 | 80,860 | 1905..... | 1,229 | 101,166 |
| 1890..... | 3,780 | 73,654 | 1906..... | 4,727 | 131,353 |
| 1891..... | 673 | 86,522 | 1907 (9 mos.).... | 12,106 | 93,458 |
| 1892..... | 473 | 59,064 | 1908..... | 2,080 | 125,747 |
| 1893..... | 110 | 38,891 | 1909..... | 2,394 | 106,399 |
| 1894..... | 53 | 24,572 | 1910..... | 2,739 | 196,002 |
| 1895..... | 695 | 20,358 | | | |

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

Pottery and Earthenware.—The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinières, crocks, jars, churns, etc. A number of potters make a higher grade product of stoneware, but the majority of these use imported clays. Sanitary ware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitary ware in 1910, according to returns received, was \$250,924; as compared with a valuation of \$285,285 in 1909, and \$200,541 in 1908. Annual statistics of production are shown herewith.

Annual Production of Pottery.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------------|----------------|---------|----------------|---------|
| | \$ | | \$ | | \$ |
| 1888..... | 27,750 | 1886..... | 163,427 | 1904..... | 140,000 |
| 1889..... | Not available | 1897..... | 129,629 | 1905..... | 120,000 |
| 1890..... | 195,242 | 1898..... | 214,675 | 1906..... | 150,000 |
| 1891..... | 258,844 | 1899..... | 185,000 | 1907..... | 253,809 |
| 1892..... | 265,811 | 1900..... | 200,000 | 1908..... | 200,541 |
| 1893..... | 213,186 | 1901..... | 200,000 | 1909..... | 285,285 |
| 1894..... | 162,144 | 1902..... | 200,000 | 1910..... | 250,924 |
| 1895..... | 151,588 | 1903..... | 200,000 | | |

Details of the imports of earthenware and chinaware showing the values imported and countries of origin have already been given on pages 15, 16, and 17,

The total imports in 1910 were valued at \$2,283,116, as compared with a value of \$1,781,759 in 1909. These imports are subdivided into eight classes and in 1910 include: brown coloured ware, \$53,413; demijohns, churns, and crocks, \$6,607; tableware of china, porcelain, white granite, \$1,545,538; china and porcelain, \$95,509; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$90,524; earthenware tiles, N.O.P., \$125,772; manufactures of earthenware, N.O.P., \$163,278; earthenware, N.O.P., \$202,475. Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, Japan, and other countries.

Imports of Earthenware and Chinaware.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|---------|--------------|-----------|--------------------|-----------|
| | \$ | | \$ | | \$ |
| 1880..... | 322,333 | 1891..... | 634,907 | 1902..... | 1,275,093 |
| 1881..... | 439,029 | 1892..... | 743,810 | 1903..... | 1,406,610 |
| 1882..... | 646,734 | 1893..... | 709,737 | 1904..... | 1,611,356 |
| 1883..... | 657,886 | 1894..... | 695,514 | 1905..... | 1,636,214 |
| 1884..... | 544,586 | 1895..... | 547,935 | 1906..... | 1,692,359 |
| 1885..... | 511,853 | 1896..... | 575,493 | 1907 (9 mos.)..... | 1,422,380 |
| 1886..... | 599,269 | 1897..... | 595,822 | 1908..... | 2,190,784 |
| 1887..... | 750,691 | 1898..... | 675,874 | 1909..... | 1,716,887 |
| 1888..... | 697,082 | 1899..... | 916,727 | 1910..... | 1,859,302 |
| 1889..... | 697,949 | 1900..... | 959,526 | | |
| 1890..... | 695,206 | 1901..... | 1,114,677 | | |

Investigation of the Clay Resources of Canada.

An investigation of Canadian clay resources was initiated by the Mines Branch in 1905 when a report was prepared on the clay resources of Manitoba. This work has been continued under the Geological Survey Branch by Dr. Heinrich Ries, who has made similar investigations into the clay resources of many parts of the United States. Dr. Ries has been assisted in this work by Mr. Joseph Keele of the Geological Survey. The season of 1909 was spent in the Maritime Provinces and 1910 in the western provinces from Manitoba to British Columbia. Preliminary reports on these investigations have been published in the Summary Report of the Geological Survey for 1909 and 1910 and also in the Transactions of the Canadian Mining Institute for 1910 and 1911, and a complete report on the clay and shale deposits of Nova Scotia and portions of New Brunswick, has just been issued by the Geological Survey.¹

The results of the field investigations in the Maritime Provinces, as published in the Summary Report of the Geological Survey for 1909, were quoted in the report of this Branch on the Production of Structural Materials and Clay Products, during 1909. With respect to the laboratory tests on these clays, Dr. Ries states:—

“The laboratory tests have shown that many of the Nova Scotia and New Brunswick clays and shales can be utilized for pressed brick manufacture, and as there are practically no producers of pressed brick eastward of Ontario, there would appear to be a good field for enterprise in this direction.”

Dr. Ries reports as follows on his field investigations during 1910:—

“The field work was begun at Winnipeg, Man., and extended westward as far as Victoria, B.C., but the present summary covers the territory between Regina and the coast.

“Samples were collected from many localities, for the purpose of testing; but as the laboratory investigation of these is not yet complete, only the mode of occurrence of the clays and shales, and the industry based thereon, is referred to.

“With reference to the geographic distribution of the clays and shales, it may be pointed out that the most extensive and important deposits lie east of the Cordilleran area, in other words, in the region of the Great Plains; while second in extent are the deposits of the Pacific coast belt.

“Few or none are found in the region lying between the eastern boundary of the Rocky Mountains and the Coast ranges.

“Geologically, the clays and shales show a somewhat restricted distribution, ranging from Jurassic to Pleistocene.

“For convenience of description the occurrences may be divided into three areas, viz.: The Great Plains, the Cordilleran, and the Pacific coast.

¹The clay and shale deposits of Nova Scotia and portions of New Brunswick, Memoir No. 16-E.

GREAT PLAINS REGION.

"In that portion of the Great Plains area lying west of the longitude of Regina and Prince Albert, surface clays and silts are abundantly distributed, and often used locally for the manufacture of common brick. The product thus made is usually of red colour, and often highly porous, but since in many districts no other material is locally available, it has to be used. Those clays which are strongly calcareous yield a buff brick.

"The Pleistocene clays and silts referred to above are in most cases glacial deposits, some of them containing small pebbles, at times of calcareous character. They are worked around Regina, Saskatoon, Prince Albert, Moosejaw, Medicine Hat, Red Deer, Cochrane, and other places of minor importance.

"At some points, as Edmonton, flood plain deposits are extensively employed for making common and pressed brick. In most cases, however, the surface clays are not adapted to pressed brick manufacture.

"There are certain areas, some of them rather extensive, that are underlain by clays and shales of Tertiary or Cretaceous age, which hold out strong promise for the future, and whose prospective value has been, in part at least, realized, even at the present time. I refer to the areas around Dirt hills, Souris valley, Medicine Hat, Edmonton, and Calgary.

"*Dirt Hills Area.*—This name is applied to a group of hills rising from the plains about 30 miles south of Moosejaw, and extending south and southeastward for some distance. The beds are of Laramie age; and about 23 miles south of Drinkwater, on the Portal branch of the Canadian Pacific railway, there are exposed a series of white and brown clays in the outer slopes of the Dirt hills. The beds appear to dip westward, and the hills in which the clays occur have a steep eastern face, and a western slope conformable to the dip.

"The predominant beds are white and greyish white sandy clays, and brownish red siliceous clay shales, as well as some gypsiferous beds and bluish clays. The white sandy beds, which form the larger part of three hills, are quite prominent, and contain occasional lenses of a finer grained white clay.

"The succession of beds, from the bottom up, where the white clays are best exposed, appears to be as follows:—

- Brownish clay-shales.
- Soft sandstone.
- Grey clay.
- White sandy clay.
- Thin beds of purplish and bluish shale.
- Brownish clay-shales.
- White and grey clays.

"The white clays are fireclays, fusing at cones 30 to 32.

"Some of the white sandy clay has been hauled up to Moosejaw and made into boiler setting brick, with good results.

"The practical development of these clays hinges upon a satisfactory solution of the transportation problem, and this may occur at no distant date, as there is said to be a projected branch of the Canadian Northern, which will pass within three miles of these clay deposits.

"*Souris Valley*.—The lignite seams of the Souris coal-field have been described by Dowling,¹ and in his paper mention is made of the sandstones and shales which are interbedded with the lignites. There seems little doubt that many of these shales could be utilized for the manufacture of clay products, but up to the present time not much has been done to develop them.

"The only locality at which they are worked is at Estevan, Sask., where the shales belonging to the upper member of the coal series in that field are mined by the Estevan Coal and Brick Company.

"The section shown in their workings is as follows:—

| | |
|---|--------------|
| Top glacial clay. | 10 to 20 ft. |
| Lignite. | 8 ft. |
| Parting clay shale. | 2 to 2½ ft. |
| Lignite. | 8" to 2 ft. |
| Blue clay shale upper 15 feet smooth. | 30 to 40 ft. |

"The top clay, which is highly calcareous and cream burning, is used for making common brick.

"The shale, which is won by drift mining, is used for making dry-pressed brick. It is red burning.

"Shales are found at a number of other points in the Souris River coal field, but some of them crack in air-drying. One very smooth plastic deposit was found overlying the clay at Pinto.

"*Medicine Hat*.—This town lies in the Belly River shale area, the beds of this formation being exposed at a number of points along the Saskatchewan river, as well as in the slopes of some of the surrounding hills, where the shales have not been removed by pre-glacial erosion, or are not covered by glacial clays or silts.

"It may be said of the shales of this area in general, that they consist of more or less lenticular bodies of clay shales, and shales which are sometimes separated by lenses of sandstone.

"The lenticular character of the beds is proven by the fact that their structural relations can sometimes be well seen in one excavation, and also because

¹Can. Geol. Survey, Annual Report, Vol. XV, pt. F.

sections on opposite sides of the river may be totally unlike so far as regards the beds over and underlying the same coal seams.

"The shales show a variety of colours, and range from highly siliceous to those of very fine grain. Some of the beds evidently contain a large amount of colloidal material, and have to be dried very slowly to prevent cracking, but this cannot always be avoided. Some of them may be cured of cracking by pre-heating, and experiments are now under way to determine this.

"Most of the shales of the Medicine Hat region are not refractory, and only one of the beds thus far opened up is claimed to be a good fireclay.

"The Belly River shales are now worked near Coleridge, and Red Cliff. At the former locality the shales outcrop on the slope of a steep ridge, and are said to have been tested by 80 ft. borings. The beds show the usual lenticular arrangement, and since the lenses vary in character, and are interbedded in places with sandstone, some selective mining and sorting is necessary. Among the types of clay thus far identified here by the owners are: sewerpipe, pressed brick, and fireclay.

"The shales are loaded on cars, which are run down a spur to the Canadian Pacific railway, and thence to Medicine Hat, where they are to be used at the new and extensive plant of the Alberta Clay Products Company.

"At Red Cliff, 6 miles up the Saskatchewan river from Medicine Hat, a somewhat deep section is exposed in a coulee running from the top of the cliff down to the river level. The shale bank has been opened up about half way down the coulee, and the section is somewhat as follows:—

| | |
|--|----------|
| Shales with sandstones. | 50 feet. |
| Dark, chocolate clay, checks in drying. | 3 " |
| Alternating shales, silts, and some lignite seams. | 30 " |
| Lignite. | 5 " |
| Sandy shales. | 15 " |
| Lignite. | 4-5 " |
| Carbonaceous shale. | 2 " |
| To river level (concealed) about. | 50 " |

"The run of the bank is used for making a red, wire-cut brick, while one bed in the upper part of the bank is employed for dry press. All of the shales are red-burning, and it is not likely that any of them are refractory.

"The raw material is worked up in the recently established plant of the Red Cliff Brick Company.

"Directly across the river is another coulee, showing an equally deep section, but the beds are entirely different, and are mostly very sandy in character.

"*Edmonton.*—There are four possible sources of clay or shale in this area as follows:—

"(1). Flood plain clays, of very silty or even sandy character, underlying the low terrace bordering the Saskatchewan river. This material is used for common and pressed brick.

"(2). Glacial (?) clays of highly plastic character, underlying the upper level terrace on which Strathcona and Edmonton stand.

"(3). Shales underlying many of the coal seams, and usually too thin to be utilized.

"(4). Shales higher up in the section than the coal seams at Edmonton and Strathcona.

"The last named appear to represent the best type of material found in the immediate vicinity of Edmonton. The best observed exposures lie just northeast of Strathcona, in the valley of Mill creek, and along the Edmonton, Yukon, and Pacific railway. They are exceedingly plastic, and are said to burn to a vitrified body. No claim is made for a high refractoriness, and some of them have a rather high air shrinkage. This horizon should be carefully prospected to determine the occurrence of clays at other localities.

"The development of the clays around Edmonton is a matter of the highest commercial importance, as the demand there for all grades of structural clay products is large.

"South of Edmonton, between that point and Calgary, Tertiary shales are found outcropping along the Red Deer river, near the town of Red Deer. Some of those weather to a very plastic clay, but they are not utilized.

"*Calgary.*—The Cretaceous shales are the most important clay resources of this district. They evidently underlie a considerable area, but at most points the outcrops have been obscured by glacial drift. The shales have, however, been opened up for miles west of Calgary. At both points the bank shows massive layers of grey and buff shale, interbedded with beds of sandstone up to 2 and 3 feet in thickness. The latter have to be rejected in quarrying.

"Although the shales contain sufficient lime carbonate to effervesce briskly with acid, there is not sufficient to destroy the red burning character of the material. It is used at both localities for making dry pressed brick.

"At Cochrane, west of Calgary, there are somewhat extensive exposures of shale, some of which are free from the sandstone beds, so abundant at the two localities mentioned above.

"*Other Localities.*—The Belly River shales are well exposed along the Belly river at Lethbridge, and also in the workings of the coal mines there. Those associated with the coal are often highly carbonaceous, and often gritty, but some, such as those exposed along the wagon road near the bridge across the

river, work up to a very plastic mass, even though they appear rather unpromising in the outcrop.

"There are also abundant shale beds from 2 to 6 or 8 feet in thickness, interstratified with Cretaceous sandstones, in the low foothills west of Lundbreck. They are best seen in the railway cuts between that town and Hillcrest. Their value and character cannot be definitely stated until the tests on them are completed.

"A somewhat important shale bed overlies the coal along the south fork of the Oldman river, 6 miles northwest of Pincher creek, and other Cretaceous clays outcrop in the creek bank on the western edge of the town, as well as several miles to the southwest along Mill creek.

"Cretaceous shales of gritty character have also been quarried at Seebe siding, east of Kananaskis. Eastward from there along the Bow river, Cretaceous outcrops are frequent, and the entire section should be carefully searched.

CORDILLERAN REGION.

"The occurrence of extensive clay deposits was not expected in this region, but nevertheless all reasonable precautions were taken to search for them.

"In the Crowsnest Pass district, the Fernie shales have been utilized at Blairmore for making a red, dry-pressed brick, of good quality. Similar shales occur at Coleman.

"Shales are associated with the coal seams at Canmore and Bankhead, but are not adapted to brick manufacture.

"Flood plain and glacial clay deposits of small extent occur in many of the valleys, and are worked at several localities, including Nelson, Castlegar Junction, Kamloops, and Enderby.

"A deposit of colluvial clay, derived from the phyllites on the slopes of Mount Stephen, is found at Field, and a fine-grained plastic clay, suitable for earthenware, occurs in the Yoho valley.

"From the preceding paragraphs it will be seen that no fireclays appear to be known in the Cordilleran region. This is unfortunate, since there are several smelters, and numerous coke ovens in operation, which now have to obtain their supplies of firebrick from the United States and England.

"It is hoped that this demand will be supplied in the future by bricks made from the fireclays at Clayburn, or possibly those of the Dirt hills, or even the fireclay (if it proves to be such) at Medicine Hat.

PACIFIC COAST BELT.

"The Tertiary beds of Sumas mountain, near Clayburn, contain one of the most interesting series of shales to be found in the western provinces.

"The section involves a series of shales, sandstones, and at least one conglomerate. Some quartz porphyry is present, but not in contact with the worked shale deposits.

"The entire series appears to dip southwest at an angle of about 15° to 20° and the shales range from those of a highly refractory character to others of much lower refractoriness. On this account some of the shales burn buff, and others red.

"At the base of the section, there appear to be at least two beds of fireclay, the lowest one divisible in some places into three parts. Of these the lowest bench is called a china-clay, and is said to burn white, but our tests show that it does not. The middle and upper bench are separated by a seam of coal, of variable thickness and containing flint clay partings. Some of the best fireclay in the mine has a fusing point of cone 32.

"These shales are said to be adapted to the manufacture of pressed, paving, and firebrick, and sewerpipe.

"Pleistocene clays are found on the lower slopes of the mountain, and can be used for common brick.

"There is now a factory in operation at Clayburn, that of the Clayburn Brick Company. A narrow gauge road has been laid for a distance of 3 miles up a gulch in Sumas mountain, and the total rise in this distance is 450 feet. The mines belonging to the Company are located along the line of this railway.

"Other deposits not yet developed are found on the opposite side of the mountain, but these will probably be opened up before long.

"Around Vancouver, along the Fraser river, at least as far east as New Westminster, and at Sumas mountain, as well as other points, there are deposits of a bluish grey stratified Pleistocene clay, which usually forms lenticular deposits, surrounded by coarse sand. The clay is of value for common bricks and is worked at New Westminster, Clayburn, Port Haney, etc.

"A glacial clay is employed for common and pressed brick manufacture on Anvil island, in Howe sound. Similar material is also worked on Sidney island, and around Victoria.

"Sewerpipe and fireproofing are made at Victoria from shales obtained near Comox, Vancouver island, and residual fireclay from the northwest end of the same island."

Mr. Keele reported as follows with respect to field investigations in Manitoba:—

"About 20 samples of clays and shales were collected at various worked and unworked localities. The limitations and possibilities of these materials will be fully considered in a report to be issued after the series of tests that are now in progress are completed.

¹ Summary Report of the Geological Survey Branch, Department of Mines, 1910, p. 181.

"The material available for structural purposes is obtained from two sources—surface clays and shales.

"The surface clays, which are usually lake or estuarine deposits, some of which may be of direct glacial origin, are the most widespread. Notwithstanding the fact that these surface deposits are, in many places, of great depth, only a limited portion of them unfortunately can, in some localities, be utilized by the clay worker. This is the case in the neighbourhood of Winnipeg, where only about 3 feet of the deposit can be used, and although there is often as much as 40 feet of clay of different quality beneath this, it is quite unsuitable for brick-making purposes. At Brandon the surface deposits consist of stratified sands, silts, and clays, with the sandy and silty layers so much in excess that good hard brick cannot be produced from them.

"At Portage la Prairie, Virden, Hartney, and Gilbert Plains, there are good deposits of clay, which can be worked to as great a depth as the brickyard owners desire. There is only a light covering of soil to be removed, and in places the brick clay comes almost to the grass roots.

"The surface clays in Manitoba are nearly all calcareous, the lime content being usually high. The underburned bricks made from them are of a light red colour, and soft and porous; the fully burned bricks are hard, light buff in colour, and make a good durable building material.

"Shales of Cretaceous age form the bed-rock of most of the western portion of the Province, but on account of the thick mantle of surface deposits, they are not generally seen outcropping. They outcrop plentifully at some localities, however, notably at the Riding, and Pembina mountains, and at two points are worked for brickmaking purposes. The shales, where exposed, are generally hard and non-plastic, so that when finely ground and mixed with water they cannot be moulded into shapes; but in some cases they are decomposed by weathering, and have become quite soft and plastic. The shale used for making dry press brick at Leary siding is in this condition. The shales burn to a red colour, and will stand much harder firing than the surface clays."

LIME.

The production of lime during 1910 did not show as large an increase over the previous year's output as did the other structural materials. The total sales were reported as 5,848,146 bushels, valued at \$1,137,079, or an average of 19 cents per bushel; as compared with 5,592,924 bushels, valued at \$1,132,756, or an average of 20 cents per bushel in 1909.

Production was reported by 70 active firms as compared with 84 firms in 1909. The average number of men employed was reported as 976 and wages paid \$466,876. There was apparently a falling off in production in the Maritime Provinces and in Quebec and an increase in Ontario and the western provinces. The average price per bushel of sales was also lower in the east and higher in the west. Four firms only reported the sale of a small quantity of hydrated lime.

A small quantity of lime is annually made in Prince Edward Island, but from stone brought over from Nova Scotia, and the figures have been included in the statistics for this Province.

Lime Production by Provinces, 1910.

| Province. | No. of active firms reporting. | Men employed | Wages paid. | SALES. | | | |
|-----------------------|--------------------------------|--------------|-------------|-----------|-----------|---------------------|--------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent of total. |
| | | | \$ | | \$ | cts. | % |
| Nova Scotia..... | 4 | 45 | 10,505 | 55,750 | 13,490 | 24 | 1.2 |
| New Brunswick..... | 6 | 109 | 42,524 | 470,050 | 105,593 | 22 | 9.3 |
| Quebec..... | 17 | 223 | 107,275 | 1,227,555 | 299,126 | 23 | 26.3 |
| Ontario..... | 31 | 410 | 180,557 | 2,988,020 | 476,137 | 16 | 41.9 |
| Manitoba..... | 5 | 95 | 48,707 | 606,679 | 100,808 | 17 | 8.8 |
| Alberta..... | 3 | 29 | 21,700 | 303,214 | 69,268 | 23 | 6.1 |
| British Columbia..... | 4 | 65 | 55,608 | 196,878 | 72,657 | 37 | 6.4 |
| Total..... | 70 | 976 | 466,876 | 5,848,146 | 1,137,079 | 19 | 100.0 |

Lime Production by Provinces, 1908 and 1909.

| Province. | 1908. | | | | 1909. | | | |
|--------------------|-----------|---------|---------------------|-------|-----------|-----------|---------------------|-------|
| | Bushels. | Value. | Average per bushel. | % | Bushels. | Value. | Average per bushel. | % |
| | | \$ | cts. | | | \$ | cts. | |
| Nova Scotia..... | 51,068 | 16,102 | 32 | 2.3 | 57,730 | 16,729 | 29 | 1.5 |
| New Brunswick... | 155,748 | 34,262 | 22 | 4.8 | 697,466 | 154,151 | 22 | 13.6 |
| Quebec..... | 857,700 | 201,357 | 23 | 28.2 | 1,281,827 | 315,633 | 25 | 27.9 |
| Ontario..... | 2,087,731 | 353,507 | 17 | 50.3 | 2,619,553 | 434,147 | 17 | 38.3 |
| Manitoba..... | 138,786 | 24,192 | 17 | 3.4 | 423,954 | 69,670 | 16 | 6.2 |
| Alberta..... | 135,000 | 34,500 | 26 | 4.8 | 281,125 | 67,350 | 24 | 5.9 |
| British Columbia.. | 176,435 | 44,027 | 25 | 6.2 | 231,269 | 75,076 | 32 | 6.6 |
| | 3,601,468 | 712,947 | 20 | 100.0 | 5,592,924 | 1,132,756 | 20 | 100.0 |

As with the other structural materials, Ontario is the largest producer, this Province being credited with about 42 per cent of the total value in 1910. Quebec was the second largest producer with 26 per cent of the total value, New Brunswick following with 9.3 per cent, and Manitoba with 8.8 per cent. The average price per bushel at kiln ranged from 16 cents in Ontario to 37 cents in British Columbia.

Statistics of the annual production of lime in Ontario as published by the Ontario Bureau of Mines are available since 1896 and are shown in the next table. With the exception of those for 1910 these returns are slightly higher than those obtained by the Mines Branch.

Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

| Calendar Year. | Bushels. | Value. | Cents per Bushel. | Calendar Year. | Bushels. | Value. | Cents per Bushel. |
|----------------|-----------|---------|-------------------|----------------|-----------|---------|-------------------|
| | | \$ | | | | \$ | |
| 1896..... | 1,800,000 | 222,000 | 12 | 1904..... | 2,600,000 | 406,800 | 16 |
| 1897..... | | | | 1905..... | 3,100,000 | 424,700 | 14 |
| 1898..... | 2,620,000 | 308,000 | 12 | 1906..... | 2,885,000 | 496,785 | 17 |
| 1899..... | 4,342,500 | 535,000 | 12 | 1907..... | 2,650,000 | 418,700 | 17 |
| 1900..... | 3,893,000 | 544,000 | 14 | 1908..... | 2,442,331 | 448,596 | 18 |
| 1901..... | 4,100,000 | 550,000 | 13 | 1909..... | 2,633,500 | 470,858 | 18 |
| 1902..... | 4,300,000 | 617,000 | 14 | 1910..... | 2,839,235 | 474,531 | 16 |
| 1903..... | 3,400,000 | 520,000 | 15 | | | | |

Exports and Imports.—The value of the lime exported during the calendar year 1910 was \$44,762, the destination of shipment being mainly the United States. The imports during the same period were 212,502 barrels, valued at \$138,847, and were also derived chiefly from the United States.

Annual statistics of exports and imports are given in the next tables:—

Exports of Lime.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------|----------------|---------|----------------|--------|
| | \$ | | \$ | | \$ |
| 1891..... | 119,853 | 1898..... | 49,594 | 1905..... | 85,723 |
| 1892..... | 121,535 | 1899..... | 73,565 | 1906..... | 57,072 |
| 1893..... | 86,623 | 1900..... | 80,852 | 1907..... | 55,903 |
| 1894..... | 83,670 | 1901..... | 99,194 | 1908..... | 43,316 |
| 1895..... | 71,697 | 1902..... | 116,009 | 1909..... | 48,821 |
| 1896..... | 70,820 | 1903..... | 131,412 | 1910..... | 44,762 |
| 1897..... | 53,177 | 1904..... | 73,838 | | |

Imports of Lime.

| Fiscal Year. | Barrels. | Value. | Fiscal Year. | Barrels. | Value. |
|--------------|----------|--------|---------------------------|----------|---------|
| | | \$ | | | \$ |
| 1880..... | 6,100 | 6,013 | 1896..... | 10,239 | 7,331 |
| 1881..... | 5,706 | 4,177 | 1897..... | 16,108 | 10,529 |
| 1882..... | 5,064 | 5,365 | 1898..... | 12,850 | 9,002 |
| 1883..... | 7,623 | 9,224 | 1899..... | 15,720 | 11,124 |
| 1884..... | 10,804 | 11,200 | 1900..... | 12,865 | 11,211 |
| 1885..... | 12,072 | 11,503 | 1901..... | 19,657 | 14,534 |
| 1886..... | 11,021 | 9,347 | 1902..... | 24,602 | 17,584 |
| 1887..... | 10,835 | 8,524 | 1903..... | 31,108 | 22,470 |
| 1888..... | 10,142 | 7,537 | 1904..... | 54,359 | 39,639 |
| 1889..... | 13,079 | 9,363 | 1905..... | 98,676 | 71,588 |
| 1890..... | 8,149 | 5,360 | 1906..... | 134,334 | 93,630 |
| 1891..... | 6,259 | 4,273 | 1907 (9 mos.)..... | 88,919 | 67,573 |
| 1892..... | 6,132 | 4,241 | 1908..... | 129,379 | 99,611 |
| 1893..... | 6,879 | 4,917 | 1909..... | 153,934 | 106,263 |
| 1894..... | 6,766 | 4,907 | 1910. Duty 20 per cent... | 191,537 | 116,964 |
| 1895..... | 12,008 | 5,743 | | | |

SAND-LIME BRICK.

Returns were received from 13 firms producing sand-lime brick during 1910, showing total sales of 44,593,541, valued at \$371,857, or an average value of \$8.34 per thousand. The total sales by nine firms in 1909 were 27,052,864 brick valued at \$201,650, or an average of \$7.45 per thousand.

The number of men employed during 1910 was 267 and wages paid \$125,594. Annual statistics of production since 1907 are shown below:—

Annual Production of Sand-Lime Brick.

| Calendar Year. | Number. | Value. | Per M. |
|----------------|------------|---------|---------|
| | | \$ | \$ cts. |
| 1907..... | 16,492,971 | 167,795 | 10 17 |
| 1908..... | 17,288,260 | 152,856 | 8 84 |
| 1909..... | 27,052,864 | 201,650 | 7 45 |
| 1910..... | 44,593,541 | 371,857 | 8 34 |

The following is a list of manufacturers of sand-lime brick from whom returns of production were received:—

- The Schultz Bros. Co., Ltd., Brantford, Ont.
- Jno. Mann Brick Co., Ltd., Brantford, Ont.
- The Silicate Brick Co., of Ottawa, Ltd., Ottawa, Ont.
- The Peterboro Sandstone Brick Co., Ltd., Peterborough, Ont.
- Toronto Indestructible Brick Co., Ltd., Toronto, Ont.
- Canada Sand Lime Pressed Brick Co., Toronto, Ont.
- The Port Arthur Sand Lime Brick Co., Port Arthur, Ont.
- The Brandon Sandstone Co., Ltd., Brandon, Man.
- Manitoba Pressed Brick Co., Ltd., Winnipeg, Man.
- Winnipeg (Eli) Sandstone Brick Co., Winnipeg, Man.
- Interocean Pressed Brick Co., Regina, Sask.
- Calgary Silicate Pressed Brick Co., Calgary, Alta.
- Victoria-Vancouver Lime and Brick Co., Victoria, B.C.

SAND AND GRAVEL.

No statistics are available as to the production of sand and gravel, but the trade returns of the Customs Department show an export and an import of these materials for a number of years, of which a record is given in the accompanying tables:—

Annual Exports of Sand and Gravel.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|---------|---------|----------------|---------|---------|
| | | \$ | | | \$ |
| 1893..... | 329,116 | 121,795 | 1902..... | 159,793 | 119,120 |
| 1894..... | 324,656 | 86,940 | 1903..... | 355,792 | 124,006 |
| 1895..... | 277,162 | 118,359 | 1904..... | 399,809 | 129,803 |
| 1896..... | 224,769 | 80,110 | 1905..... | 306,935 | 152,805 |
| 1897..... | 152,963 | 76,729 | 1906..... | 336,550 | 139,712 |
| 1898..... | 165,954 | 90,498 | 1907..... | 298,095 | 119,853 |
| 1899..... | 242,450 | 101,640 | 1908..... | 298,954 | 161,387 |
| 1900..... | 197,558 | 101,666 | 1909..... | 481,584 | 256,166 |
| 1901..... | 197,302 | 117,465 | 1910..... | 624,824 | 407,974 |

Annual Imports of Sand and Gravel.

| Fiscal Year. | Tons. | Value. | Fiscal Year. | Tons. | Value. |
|--------------|--------|--------|--------------------|---------|---------|
| | | \$ | | | \$ |
| 1893..... | 26,065 | 31,739 | 1902..... | 47,381 | 58,668 |
| 1894..... | 41,573 | 33,506 | 1903..... | 91,518 | 95,647 |
| 1895..... | 19,609 | 24,779 | 1904..... | 110,634 | 107,547 |
| 1896..... | 18,953 | 24,604 | 1905..... | 85,339 | 92,722 |
| 1897..... | 21,308 | 25,222 | 1906..... | 116,500 | 173,727 |
| 1898..... | 32,148 | 43,287 | 1907 (9 mos.)..... | 171,700 | 177,412 |
| 1899..... | 30,288 | 42,209 | 1908..... | 266,704 | 223,043 |
| 1900..... | 35,713 | 41,280 | 1909..... | 132,153 | 136,011 |
| 1901..... | 35,749 | 42,891 | 1910..... | 151,932 | 155,012 |

SLATE.

The production of slate has shown little variation for a number of years, the output having been obtained entirely from the New Rockland slate quarries of Richmond county, Quebec, which are operated under lease by Messrs. Frazer and Davies.

The production in 1910 was reported as 3,959 squares, valued at \$18,492; as compared with 4,000 squares, valued at \$19,000, in 1909.

Statistics of annual production since 1886 are shown herewith:—

Annual Production of Slate.

| Calendar Year. | Tons. | Value. | Calendar Year. | Squares. | Value. |
|----------------|-------|---------|----------------|----------|--------|
| | | \$ | | | \$ |
| 1886..... | 5,345 | 64,675 | 1898..... | | 40,791 |
| 1887..... | 7,357 | 89,000 | 1899..... | | 33,406 |
| 1888..... | 5,314 | 90,689 | 1900..... | | 12,100 |
| 1889..... | 6,935 | 119,160 | 1901..... | | 9,980 |
| 1890..... | 6,868 | 100,250 | 1902..... | | 19,200 |
| 1891..... | 5,000 | 65,000 | 1903..... | 5,510 | 22,040 |
| 1892..... | 5,180 | 69,070 | 1904..... | 5,277 | 23,247 |
| 1893..... | 7,112 | 90,825 | 1905..... | | 21,568 |
| 1894..... | | 75,550 | 1906..... | | 24,446 |
| 1895..... | | 58,900 | 1907..... | 4,335 | 20,056 |
| 1896..... | | 53,370 | 1908..... | 2,950 | 13,496 |
| 1897..... | | 42,800 | 1909..... | 4,000 | 19,000 |
| | | | 1910..... | 3,959 | 18,492 |

No exports of slate are reported for 1910. The imports, however, are quite large and in value aggregate nearly eight times the domestic production.

The total value of the imports during the calendar year 1910 was \$142,285, comprising: roofing slate, \$67,063; school writing slate, \$31,397; slate pencils, \$6,948; other slates and manufactures of slate, \$36,877. The imports of roofing slate, school writing slate, and manufactures of slates N.O.P. are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come principally from Germany and the United States.

Statistics of imports and exports are shown in the following tables:—

Imports of Slate during the Years 1909 and 1910.

| Slate and Manufactures of | 12 months ending March, 1910. | 12 months ending Dec., 1909. | 12 months ending Dec., 1910. |
|---|-------------------------------|------------------------------|------------------------------|
| | \$ | \$ | \$ |
| Roofing slate..... | 72,842 | 71,914 | 67,063 |
| School writing slate..... | 31,252 | 34,085 | 31,397 |
| Slate pencils..... | 6,096 | 6,154 | 6,948 |
| Slate of all kinds and manufactures of..... | 26,211 | 23,068 | 36,877 |
| | 136,401 | 135,221 | 142,285 |

Exports of Slate.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|-------------------|-------|--------|
| | | \$ | | | \$ |
| 1884..... | 539 | 6,845 | 1892..... | 87 | 2,038 |
| 1885..... | 346 | 5,274 | 1893..... | 178 | 3,168 |
| 1886..... | 34 | 495 | 1894..... | 187 | 3,610 |
| 1887..... | 27 | 373 | 1895..... | 36 | 574 |
| 1888..... | 22 | 475 | 1896..... | 301 | 8,913 |
| 1889..... | 26 | 3,303 | 1897 to 1907..... | Nil. | Nil. |
| 1890..... | 12 | 153 | 1908..... | | 2,539 |
| 1891..... | 15 | 195 | 1909..... | 134 | 612 |
| | | | 1910..... | Nil. | Nil. |

Imports of Slate.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|--------|--------------|--------|--------------------|---------|
| | \$ | | \$ | | \$ |
| 1880..... | 21,431 | 1890..... | 22,871 | 1900..... | 53,707 |
| 1881..... | 22,184 | 1891..... | 46,104 | 1901..... | 72,187 |
| 1882..... | 24,543 | 1892..... | 50,441 | 1902..... | 72,601 |
| 1883..... | 24,968 | 1893..... | 51,179 | 1903..... | 84,437 |
| 1884..... | 28,816 | 1894..... | 29,267 | 1904..... | 86,057 |
| 1885..... | 28,169 | 1895..... | 19,471 | 1905..... | 93,228 |
| 1886..... | 27,852 | 1896..... | 24,176 | 1906..... | 112,941 |
| 1887..... | 27,845 | 1897..... | 21,615 | 1907 (9 mos.)..... | 95,520 |
| 1888..... | 23,151 | 1898..... | 24,907 | 1908..... | 131,069 |
| 1889..... | 41,370 | 1899..... | 33,100 | 1909..... | 124,065 |
| | | | | 1910..... | 136,401 |

Mr. J. A. Dresser of the Geological Survey describes¹ the slate of the Eastern Townships, Province of Quebec, as follows:—

“Slate of good quality both for roofing and other purposes occurs in several places in the Ordovician and Cambrian strata adjacent to the serpentine belt. In a number of these places quarries were opened between thirty and fifty years ago, but most of them have long since been closed from one cause or another, principally, it would appear, from an insufficient market at the time they were operated.

“At the present time these conditions have apparently changed for the better, and the slate deposits might properly receive renewed attention.

“*Ordovician Slates.*—The Ordovician slates occur in the argillaceous parts of the Farnham (lower Trenton) formation. They are dark, or bluish grey in colour, and have an excellent cleavage, nearly vertical, which may be at any angle to the bedding planes.

“These slates have been quarried at Danville, Corris, Brompton, Melbourne, and New Rockland. The last mentioned quarry is the only one at present in operation in eastern Canada. The slate produced is of excellent quality.

“The quarries at Corris, Melbourne, and New Rockland are situated so near the contact of the slates with an intrusive sheet of peridotite and serpentine as to be within the zone of alteration thus produced. The nearness to the serpentine is both a favourable and unfavourable factor. Outside of the zone of contact metamorphism the slate is soft, and lacks the strength that makes it especially valuable when slightly hardened by the intrusion; but within the contact zone, quartz veins, or flints become more numerous as the serpentine is approached, and thus tend to lessen the value of the slate. Very near the contact, too, the slate becomes a fine hornstone, too hard to be well worked; and it is then said to be sharp. The part of the rock of greatest value seems, therefore, to be near enough to the contact with the intrusive rock to secure strong slate, and far enough from it that the spaces between the flints are so large as to be worked advantageously.

“The other features that injure the slate are oblique cleavages called slants, and shattered bands known as posts. These depend on mechanical deformation, and may be connected with the intrusion of the serpentine. At the Melbourne quarry, dykes of pyroxenite strike off from the intrusive rocks for 40 feet into the slate.

“In its original composition, the rock may have largely been made up of good material for slate, except near the bottom of the slate beds where the basal conglomerate is found. Slabs taken from the lowest level at the north side of the main pit at New Rockland show pebbles of Cambrian sandstone and quartzite, and indicate that the bottom of the slate has there been reached.

¹ Summary report of the Geological Survey Branch, Department of Mines, 1910, p. 217.

"The New Rockland quarry has been operated almost continually since 1868. During the past eight years it has been worked by Messrs. Frazer and Davies under a lease from the New Rockland Slate Company. Some 35 men are employed, two steam drills, and three derricks are in operation, steam and water-power are used. Only roofing slate is now made.

"The quarrying is done in open pits, the rocks being cut down in benches. The rock is first assorted in the pit, and that suitable for splitting is hoisted and sent to the splitting sheds. There, it is cut, split, and trimmed to the sizes required, or to which it is best adapted. The usual thickness is $\frac{1}{8}$ inch, and the superficial sizes vary from 12 inches by 24 inches to 6 inches by 12 inches. While working on higher levels in a deep pit, the waste rock is allowed to accumulate to some depth in the bottom, in order to lessen the loss from breakage of good slate by falling into the pit before blasting. During winter it is an advantage to have as little of the walls exposed to the frost as possible, since the slate, once frozen, becomes valueless if it is not split when frozen. The waste rock is, therefore, removed somewhat irregularly.

"*Cambrian Slates.*—The Cambrian slates are green and reddish or purple in colour, and where there is a mingling of these colours a handsome mottled slate results. The green colour, in all cases seen, is that known as the ever or unfading green. The slates of this formation, as far as known, have not been influenced by the action of igneous rocks. They split less smoothly than the dark slates just described, having a coarser texture, and are frequently not as strong.

"The quarries that have been opened usually show large bodies of slate free from quartz veins, and sometimes having different colours in different parts of the same pit. A few buildings in the district have roofs on which these slates are said to have lain for 50 years without change of colour or serious breakage.

"Very similar slates are quarried at Fairhaven, Vermont, and are the principal variety produced in the large slate industry of that State. The manner of dressing the slate there is different from that at New Rockland, probably because of different market conditions. At New Rockland thin slates $\frac{1}{8}$ inch are generally used, while at Fairhaven the purple, green, and mottled slates are split in thickness ranging from $\frac{1}{4}$ inch to $1\frac{1}{4}$ inches. The price varies with the thickness, an increase of about \$2 per square being allowed for each additional $\frac{1}{4}$ inch. Besides being cut to proper sizes, and split to the required thickness, the slates are bored for nail or bolt holes, and the holes are counter sunk, for which an extra charge is made. These heavy slates are said to be used principally for roofing on large steel buildings of the class now being built in the larger cities.

"Slate of this quality has been opened at several places in and near this district. Green slate occurs three-fourths of a mile south of New Rockland quarry; purple and green at the Kingsey quarry, 6 miles north of Richmond, also in Brompton, southeast of Mud pond, and at other places in the Eastern Townships.

"Roofing slate is bought and sold by the square, that is sufficient slate to cover 100 square feet after allowance has been made for all overlapping. A square of slate $\frac{1}{4}$ inch in thickness weighs upwards of 1,000 pounds; hence the thicker grades weigh a ton, or, a ton and a half per square. The present prices in New England for slate of good quality range from \$6 to \$12 per square, according to thickness. In Canada most of the slate is made into the lighter or thinner grades, for which the prices are a little below those obtained in New England."

STONE.

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone, and flagstone, rubble, rip-rap, and crushed stone, limestone for furnace, flux, sugar factories, etc., but stone used for burning lime or the manufacture of cement is not included.

The kinds of stone quarried have been classed as granite, limestone, sandstone, and marble.

The records are practically confined to quarry operations or the production of sawn or polished stone when these operations are carried on by the quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals such as farmers and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is probably also used in railway construction work and in road building, of which no record has yet been obtained.

The statistics obtained for 1909 were much more complete than those for former years, and for that reason it is somewhat difficult to make comparisons.

It is impossible, also, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the production of stone in 1910, according to returns received, was \$3,650,019, as compared with a value of \$3,127,135 in 1909; showing an increased production of \$522,884 or 16.72 per cent.

In 1908 the total value of the production was estimated at \$2,378,318. The number of active firms reporting in 1910 was 166; the total number of men employed 5,105; and total wages paid \$2,225,791. In 1909 the total number of men reported employed in connexion with stone quarrying was 4,843, and the wages paid \$2,111,987.

Of the total value of the 1910 production, limestone constituted \$2,249,576 or 61.7 per cent; granite, \$739,516 or 20.3 per cent; sandstone, \$502,148 or 13.7 per cent, and marble, \$158,779 or 4.3 per cent.

Stone was used for building purposes to the value of \$1,504,001 or 41.2 per cent of the total; monumental and ornamental stone, a value of \$147,421 or 4 per cent; curb paving and flagstone, \$239,668 or 6.6 per cent; rubble, \$352,000 or 9.7 per cent; crushed stone, \$975,379 or 26.7 per cent, and furnace flux, 896,757 tons, valued at \$431,550, or 11.8 per cent.

By provinces, Quebec shows the largest output, having a value of \$1,469,086 or 40.3 per cent of the total, being made up of limestone to the value of \$962,429 granite valued at \$356,257, and marble, \$151,000. Ontario again takes second place with a production of \$898,788, or 24.6 per cent of the total: of which limestone is credited with \$722,763; granite, \$109,678; sandstone, \$62,247, and marble, \$4,100. British Columbia ranked third in order of importance with a total of \$422,392, including: granite, \$244,767; sandstone, \$130,825; limestone, \$43,121, and marble, \$3,679. The production in Manitoba was valued at \$331,672, made up of limestone, \$328,029, and granite, \$3,643. Alberta takes fifth place in 1910 with a total production of \$240,858, all sandstone. The Nova Scotia production was reported as \$227,635, comprising: limestone, \$192,919; granite, \$18,291, and sandstone, \$16,425. New Brunswick is credited with \$58,988, made up chiefly of sandstone and granite.

Production of Stone by Provinces, 1910.

| Province. | Granite. | Limestone. | Marble. | Sandstone. | Total. | % |
|-----------------------|----------|------------|---------|------------|-----------|-------|
| | \$ | \$ | \$ | \$ | \$ | |
| Nova Scotia..... | 18,291 | 192,919 | | 16,425 | 227,635 | 6.2 |
| New Brunswick..... | 6,880 | 315 | | 51,793 | 58,988 | 1.6 |
| Quebec..... | 356,257 | 962,429 | 151,000 | | 1,469,686 | 40.3 |
| Ontario..... | 109,678 | 722,763 | 4,100 | 62,247 | 898,788 | 24.6 |
| Manitoba..... | 3,643 | 328,029 | | | 331,672 | 9.1 |
| Alberta..... | | | | 240,858 | 240,858 | 6.6 |
| British Columbia..... | 244,767 | 43,121 | 3,679 | 130,825 | 422,392 | 11.6 |
| Totals..... | 739,516 | 2,249,576 | 158,779 | 502,148 | 3,650,019 | 100.0 |
| Per cent..... | 20.3 | 61.7 | 4.3 | 13.7 | 100.0 | |

Value of Stone Sold for Various Purposes in 1910.

| Kind. | Building. | Ornamental and Monumental. | Paving and Curbstone. | Rubble. | Crushed. | Furnace Flux. | Total. |
|----------------|-----------|----------------------------|-----------------------|---------|----------|---------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Granite..... | 268,197 | 74,576 | 79,501 | 46,639 | 270,603 | ..... | 739,516 |
| Limestone..... | 623,149 | 72,580 | 125,637 | 295,168 | 701,556 | 431,486 | 2,249,576 |
| Marble..... | 158,700 | ..... | ..... | 15 | ..... | 64 | 158,779 |
| Sandstone..... | 453,955 | 265 | 34,530 | 10,178 | 3,220 | ..... | 502,148 |
| Totals..... | 1,504,001 | 147,421 | 239,668 | 352,000 | 975,379 | 431,550 | 3,650,019 |

Production of Stone by Provinces and for Purposes used, 1910.

| Province. | Building. | Ornamental and Monumental. | Paving and Curbstone. | Rubble. | Crushed. | Furnace Flux. | Total. |
|-----------------------|-----------|----------------------------|-----------------------|---------|----------|---------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 18,610 | 11,156 | 4,600 | ..... | 350 | 192,919 | 227,635 |
| New Brunswick..... | 49,047 | 6,880 | ..... | 2,761 | 200 | 100 | 58,988 |
| Quebec..... | 707,890 | 116,456 | 165,730 | 143,930 | 329,627 | 6,053 | 1,469,686 |
| Ontario..... | 83,602 | 9,929 | 65,588 | 135,550 | 414,826 | 189,293 | 898,788 |
| Manitoba..... | 215,378 | ..... | ..... | 53,302 | 62,992 | ..... | 331,672 |
| Alberta..... | 234,437 | ..... | ..... | 6,371 | ..... | ..... | 240,858 |
| British Columbia..... | 194,987 | 3,000 | 3,750 | 10,086 | 167,384 | 43,185 | 422,392 |
| Totals..... | 1,504,001 | 147,421 | 239,668 | 352,000 | 975,379 | 431,550 | 3,650,019 |
| Per cent..... | 41.2 | 4.0 | 6.6 | 9.7 | 26.7 | 11.8 | 100.0 |

Production of Stone by Provinces, 1909.

| Province. | Granite. | Limestone. | Marble. | Sandstone. | Total. | % |
|-----------------------|----------|------------|---------|------------|-----------|-------|
| | \$ | \$ | \$ | \$ | \$ | |
| Nova Scotia..... | 5,832 | 161,922 | ..... | 21,850 | 189,604 | 6.1 |
| New Brunswick..... | 11,541 | 30 | ..... | 30,609 | 42,180 | 1.3 |
| Quebec..... | 257,096 | 972,253 | 130,000 | ..... | 1,359,349 | 43.5 |
| Ontario..... | 42,700 | 639,674 | 3,441 | 62,824 | 748,639 | 23.9 |
| Manitoba..... | 3,345 | 328,554 | ..... | ..... | 331,899 | 10.6 |
| Alberta..... | ..... | ..... | ..... | 90,333 | 90,333 | 2.9 |
| British Columbia..... | 134,310 | 37,258 | 25,000 | 168,513 | 365,081 | 11.7 |
| Totals..... | 454,824 | 2,139,691 | 158,441 | 374,179 | 3,127,135 | 100.0 |
| Per cent..... | 14.5 | 68.4 | 5.1 | 12.0 | 100 | |

Value of Stone Sold for Various Purposes in 1909.

| Kind. | Building. | Ornamental and Monumental. | Paving and Curbstone. | Rubble. | Crushed. | Furnace Flux. | Total. |
|----------------|-----------|----------------------------|-----------------------|---------|----------|---------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Granite..... | 159,470 | 73,611 | 106,963 | 63,205 | 51,575 | ..... | 454,824 |
| Limestone..... | 666,324 | 95,457 | 154,490 | 210,418 | 609,349 | 403,613 | 2,139,691 |
| Marble..... | 20,000 | 135,780 | ..... | 2,661 | ..... | ..... | 158,441 |
| Sandstone..... | 324,716 | 1,490 | 17,774 | 26,836 | 3,363 | ..... | 374,179 |
| Totals..... | 1,170,550 | 306,338 | 279,227 | 303,120 | 664,287 | 403,613 | 3,127,135 |

Production of Stone by Provinces and for Purposes used, 1909.

| Province. | Building. | Ornamental and Monumental. | Paving and Curbstone. | Rubble. | Crushed. | Furnace Flux. | Total. |
|-----------------------|-----------|----------------------------|-----------------------|---------|----------|---------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 16,043 | 4,018 | 2,846 | 6,000 | 800 | 159,897 | 189,604 |
| New Brunswick..... | 29,192 | 7,038 | 450 | 5,500 | ..... | ..... | 42,180 |
| Quebec..... | 554,722 | 230,095 | 210,426 | 94,241 | 259,615 | 10,250 | 1,359,349 |
| Ontario..... | 99,200 | 12,687 | 54,443 | 82,449 | 303,652 | 196,208 | 748,639 |
| Manitoba..... | 179,605 | 45,000 | 62 | 49,312 | 57,920 | ..... | 331,899 |
| Alberta..... | 87,450 | ..... | ..... | 2,933 | ..... | ..... | 90,383 |
| British Columbia..... | 204,338 | 7,500 | 11,000 | 62,685 | 42,300 | 37,253 | 365,081 |
| Totals..... | 1,170,550 | 306,338 | 279,227 | 303,120 | 664,287 | 403,613 | 3,127,135 |
| Per cent..... | 37.4 | 9.8 | 8.0 | 9.7 | 21.3 | 12.9 | 100. |

Exports and Imports.—The exports of stone are classified simply as wrought and unwrought; the total value of the exports in 1910 was \$27,471 as compared with \$59,370 in 1909 and \$58,005 in 1908.

The annual exports since 1890 are shown in the following table:—

Exports of Stone and Marble, Wrought and Unwrought.

| Calendar Year. | Wrought. | Unwrought. | Calendar Year. | Wrought. | Unwrought. |
|----------------|----------|------------|----------------|----------|------------|
| | \$ | \$ | | \$ | \$ |
| 1890..... | 21,725 | 43,611 | 1900..... | 5,933 | 115,711 |
| 1891..... | 13,398 | 46,162 | 1901..... | 5,917 | 157,739 |
| 1892..... | 7,698 | 47,424 | 1902..... | 8,632 | 124,829 |
| 1893..... | 9,102 | 12,532 | 1903..... | 7,684 | 46,295 |
| 1894..... | 22,576 | 34,130 | 1904..... | 4,760 | 17,802 |
| 1895..... | 8,587 | 51,616 | 1905..... | 3,545 | 13,089 |
| 1896..... | 4,934 | 32,897 | 1906..... | 23,097 | 4,675 |
| 1897..... | 9,415 | 42,034 | 1907..... | 4,233 | 3,087 |
| 1898..... | 2,526 | 65,370 | 1908..... | 15,194 | 42,811 |
| 1899..... | 5,092 | 101,931 | 1909..... | 33,598 | 25,772 |
| | | | 1910..... | 5,352 | 22,119 |

The imports are classified as building stone of all kinds, except marble, manufactures of granite and other stone, and marble and its manufactures. The total value of the imports of stone during the calendar year 1910 was \$845,123, as compared with a value in 1909 of \$683,801; showing an increase of \$161,322, or 23.6 per cent. Of the total imports during 1910, \$311,595 in value was classed as building stone, and \$192,213 as granite sawn and manufactures of; \$74,100 as paving blocks, and \$267,215 as marble and manufactures of.

During 1909 the imports of building stone were \$280,557; granite, \$162,742; paving blocks, \$58,355, and marble, \$182,147.

The imports during both years were derived chiefly from the United States and Great Britain; the United States supplying building stone, paving blocks, and marble principally. The imports from Great Britain consisted mainly of manufactures of granite. Marble is obtained in some quantity also from Italy and other countries. The total value of the imports from the United States in 1910 was \$640,084; from Great Britain, \$160,664; from Italy, \$31,314 and from other countries, \$13,061.

Total Imports of Stone during the Calendar Years 1909 and 1910.

| Imports. | 1909. | | 1910. | |
|--|--------|------------|--------|------------|
| | Tons. | Value. | Tons. | Value. |
| Building stone, rough (1)..... | 21,746 | \$ 102,470 | 27,658 | \$ 125,531 |
| " dressed (2)..... | 35,910 | 178,087 | 33,996 | 186,064 |
| Granite, sawn only..... | 307 | 2,380 | 789 | 3,287 |
| " manufactures of..... | | 129,918 | | 154,798 |
| Paving blocks..... | | 58,355 | | 74,100 |
| Manufactures of stone, N.O.P..... | | 30,444 | | 34,128 |
| Marble and manufactures of— | | | | |
| Marble, sawn or sand rubbed, not polished..... | | 118,095 | | 154,153 |
| " rough, not hammered or chiselled..... | | 8,414 | | 18,368 |
| " manufactures of, N.O.P..... | | 55,638 | | 94,694 |
| | | 683,801 | | 845,123 |

(1) Flagstones, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

(2) Flagstone; all other building stone, sawn or dressed.

Imports of Stone, showing Country of Origin, Calendar Year 1910.

| Imports. | Great Britain. | | United States. | | Italy. | Other Countries. |
|--|----------------|----------|----------------|------------|--------|------------------|
| | Tons. | Value. | Tons. | Value. | Value. | Value. |
| Building stone, rough (1)..... | 265 | \$ 1,810 | 26,951 | \$ 122,531 | \$ | \$ *1,190 |
| " dressed (2)..... | 42 | 153 | 33,954 | 185,911 | | |
| Granite, sawn only..... | 7 | 37 | 782 | 3,250 | | |
| " manufactures of..... | | 149,958 | | 4,762 | | 78 |
| Paving blocks..... | | 0 | | 73,033 | | 1,067 |
| Manufactures of stone, N.O.P..... | | 4,340 | | 27,548 | | 2,240 |
| Marble and manufactures of— | | | | | | |
| Marble, sawn or sand rubbed, not polished..... | | 299 | | 122,168 | | 372 |
| " rough, not hammered or chiselled..... | | | | 12,939 | 31,314 | 5,429 |
| " manufactures of, N.O.P..... | | 4,067 | | 87,942 | | 2,685 |
| | | 160,664 | | 640,084 | 31,314 | 13,061 |

(1) Flagstones, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

(2) Flagstone; all other building stone, sawn or dressed.

(*) Represents value of 442 tons.

Imports of Stone, Fiscal Years 1909 and 1910.

| Imports. | 1909. | | 1910. | |
|--|--------|-----------|--------|------------|
| | Tons. | Value. | Tons. | Value. |
| Building stone, rough (1)..... | 14,011 | \$ 63,984 | 23,928 | \$ 110,997 |
| " dressed (2)..... | 16,841 | 72,961 | 36,884 | 184,620 |
| Granite, sawn only..... | 302 | 2,756 | 280 | 2,146 |
| " manufactures of..... | | 123,155 | | 130,697 |
| Paving blocks..... | | 42,420 | | 58,247 |
| Manufactures of stone, N.O.P..... | | 25,618 | | 32,372 |
| Marble and manufactures of— | | | | |
| Marble, sawn or sand rubbed, not polished..... | | 108,522 | | 128,897 |
| " rough, not hammered or chiselled..... | | 9,138 | | 1,398 |
| " manufactures of, N.O.P..... | | 83,268 | | 54,503 |
| | | 531,822 | | 703,877 |

(1) Flagstones, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

(2) Flagstone; all other building stone, sawn or dressed.

Annual Imports of Stone.

| Fiscal Year. | BUILDING STONE. | | Manufactures of Granite, etc. | Marble. | Flagstones. | Total Value |
|--------------|-----------------|----------|-------------------------------|---------|-------------|-------------|
| | Rough. | Dressed. | | | | |
| | \$ | \$ | \$ | \$ | \$ | \$ |
| 1880..... | 32,824 | 3,146 | 29,408 | 63,015 | | 128,393 |
| 1881..... | 7,823 | 50,326 | 36,877 | 85,977 | 241 | 181,244 |
| 1882..... | 32,848 | 775 | 37,267 | 109,505 | 848 | 181,243 |
| 1883..... | 33,429 | 1,632 | 45,636 | 128,520 | 99 | 209,316 |
| 1884..... | 46,232 | 4,856 | 45,290 | 108,771 | 1,158 | 206,307 |
| 1885..... | 28,433 | 2,058 | 39,867 | 102,835 | 1,756 | 174,949 |
| 1886..... | 36,776 | 4,899 | 41,984 | 117,752 | 9,443 | 210,854 |
| 1887..... | 47,819 | 6,549 | 41,829 | 104,250 | 10,966 | 211,413 |
| 1888..... | 84,263 | 2,110 | 47,487 | 94,681 | 21,077 | 249,618 |
| 1889..... | 89,723 | 10,591 | 61,341 | 118,421 | 15,451 | 295,527 |
| 1890..... | 126,456 | 5,699 | 84,396 | 99,353 | 48,995 | 364,899 |
| 1891..... | 151,119 | 19,771 | 61,051 | 107,661 | 36,348 | 372,950 |
| 1892..... | 85,169 | 10,381 | 39,479 | 106,268 | 15,048 | 256,345 |
| 1893..... | 47,609 | 8,901 | 49,323 | 96,177 | 8,500 | 210,510 |
| 1894..... | 48,097 | 4,811 | 49,510 | 94,657 | 2,429 | 199,504 |
| 1895..... | 37,732 | 6,550 | 51,050 | 83,422 | 84 | 178,838 |
| 1896..... | 42,737 | 11,393 | 51,499 | 90,065 | Nil | 195,694 |
| 1897..... | 27,442 | 11,272 | 34,026 | 77,150 | 227 | 150,117 |
| 1898..... | 25,322 | 3,173 | 41,240 | 95,894 | 1,540 | 167,129 |
| 1899..... | 43,494 | 4,546 | 60,148 | 104,879 | Nil | 210,067 |
| 1900..... | 63,376 | 1,157 | 57,039 | 94,017 | 63 | 215,652 |
| 1901..... | 45,039 | 1,039 | 66,639 | 96,159 | 116 | 208,992 |
| 1902..... | 69,972 | 29,102 | 72,397 | 130,424 | 1,231 | 303,126 |
| 1903..... | 71,202 | 16,664 | 78,629 | 153,481 | Nil | 319,976 |
| 1904..... | 59,864 | 33,914 | 141,165 | 181,511 | Nil | 416,454 |
| 1905..... | 49,004 | 53,813 | 150,160 | 145,466 | Nil | 398,443 |
| 1906..... | 66,994 | 65,134 | 178,435 | 189,589 | Nil | 500,152 |
| 1907..... | 58,398 | 78,967 | 136,779 | 176,450 | Nil | 450,594 |
| 1908..... | 80,950 | 90,740 | 192,248 | 287,587 | Nil | 661,525 |
| 1909..... | 63,984 | 72,961 | 13,949 | 200,928 | Nil | 531,822 |
| 1910..... | 110,997 | 184,620 | 223,462 | 184,798 | Nil | 703,877 |

GRANITE.

The production of granite and trap-rock in 1910, according to returns from 33 active firms reporting, was valued at \$739,516; as compared with a production by 29 firms valued at \$454,824 in 1909; showing an increase of \$284,692, or 63 per cent.

There was an increased production of granite for building, monumental, and ornamental purposes, a very large increase in the production of crushed granite, and a falling off in values of granite sold for curbing, paving, and rubble.

Quebec province was the largest producer, the value of sales in 1910 being \$356,257, as compared with \$257,096 in 1909. The value of sales in British Columbia in 1910 was \$244,767, as compared with \$134,310 in 1909; while Ontario produced a value of \$109,678 in 1910, as compared with \$42,700 in 1909.

New Brunswick was at one time a large producer of granite, the quarries in the vicinity of St. George being extensively operated. There is still a considerable industry at St. George, although much less than formerly, in the manufacture of granite, the total value of the dressed stone produced in 1910 being \$70,000. The rough stone, however, is now obtained largely from other quarries including Spoon island, N.B., Redbeach, Maine, and Mt. Johnston, Que.

Statistics of the production by provinces for 1910 and 1909, showing the purposes for which the stone was sold and the annual total production since 1886, are shown in the following tables:—

Value of Granite Production by Provinces, 1909.

| Province. | Building. | Monumental or Ornamental | Curb, Or Paving. | Rubble. | Crushed. | Total. |
|-----------------------|-----------|--------------------------------|---------------------|---------|----------|---------|
| | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 458 | 2,528 | 2,846 | ..... | ..... | 5,832 |
| New Brunswick..... | 3,378 | 7,038 | 450 | 675 | ..... | 11,541 |
| Quebec..... | 139,634 | 53,845 | 56,167 | 20 | 2,430 | 257,096 |
| Ontario..... | ..... | 2,700 | 36,500 | ..... | 3,500 | 42,700 |
| Manitoba..... | ..... | ..... | ..... | ..... | 3,345 | 3,345 |
| British Columbia..... | 16,000 | 2,500 | 11,000 | 62,510 | 44,300 | 134,310 |
| Total..... | 159,470 | 73,611 | 106,963 | 63,205 | 51,575 | 454,824 |

Value of Granite Production by Provinces, 1910.

| Province. | Building. | Monumental or Ornamental | Curb, or Paving. | Rubble. | Crushed. | Total. |
|-----------------------|-----------|--------------------------------|---------------------|---------|----------|---------|
| | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 2,600 | 11,091 | 4,600 | | | 18,291 |
| New Brunswick..... | | 6,880 | | | | 6,880 |
| Quebec..... | 202,435 | 53,405 | 40,831 | 3,055 | 56,531 | 356,257 |
| Ontario..... | 1,100 | 200 | 30,320 | 33,513 | 44,545 | 109,678 |
| Manitoba..... | | | | | 3,643 | 3,643 |
| British Columbia..... | 62,062 | 3,000 | 3,750 | 10,071 | 165,884 | 244,767 |
| Total..... | 268,197 | 74,576 | 79,501 | 46,639 | 270,603 | 739,516 |

Annual Production of Granite.

| Calendar Year. | Tons. | Value. | Calendar Year | Tons. | Value. |
|----------------|--------|---------|---------------|--------|---------|
| | | \$ | | | \$ |
| 1886..... | 6,062 | 63,309 | 1898..... | 23,897 | 81,073 |
| 1887..... | 21,217 | 142,506 | 1899..... | 13,418 | 90,542 |
| 1888..... | 21,352 | 147,305 | 1900..... | | 80,000 |
| 1889..... | 10,197 | 79,624 | 1901..... | | 155,000 |
| 1890..... | 13,307 | 65,985 | 1902..... | | 210,000 |
| 1891..... | 13,637 | 70,056 | 1903..... | | 200,000 |
| 1892..... | 24,302 | 89,326 | 1904..... | | 150,000 |
| 1893..... | 22,521 | 94,393 | 1905..... | | 226,305 |
| 1894..... | 16,392 | 109,936 | 1906..... | | 273,419 |
| 1895..... | 19,238 | 84,838 | 1907..... | 15,136 | 194,712 |
| 1896..... | 18,717 | 106,709 | 1908..... | | 282,320 |
| 1897..... | 19,345 | 61,934 | 1909..... | | 454,824 |
| | | | 1910..... | | 739,516 |

LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators nor that of the stone used in the manufacture of cement, a record of lime and cement production being separately given. With these exceptions the total value of the production of limestone in Canada in 1910 was \$2,249,576, as compared with a value of \$2,139,691 in 1909, or an increase of about 5 per cent.

There was a decrease in the production of limestone for building and ornamental purposes and for curbstone and paving, but an increased production of crushed stone, rubble, and furnace flux.

The production during 1910 of limestone for building purposes was valued at \$695,729, as against \$761,821 in 1909; the value of crushed stone in 1910 was \$701,556, as against \$609,349 in the previous year. Curbstone and paving blocks were produced to the value of \$125,637 in 1910, as compared with \$154,490 in 1909. The value of rubble in 1910 was \$295,168, as against \$210,418 in 1909. The production of furnace flux in 1910 was 896,677 tons, valued at \$431,486, as compared with 842,232 tons, valued at \$403,613, in 1909.

There is no separate record of the production of limestone in 1908 or previous years.

Value of Limestone Production by Provinces, 1909.

| Province. | Building and Ornamental. | Crushed. | Curbstone and Paving. | Rubble. | Furnace Flux. | | Total. |
|-----------------------|--------------------------|----------|-----------------------|---------|---------------|---------|-----------|
| | | | | | Tons. | \$ | |
| | \$ | \$ | \$ | \$ | | | \$ |
| Nova Scotia..... | 2,025 | | | | 319,795 | 159,897 | 161,922 |
| New Brunswick..... | 30 | | | | | | 30 |
| Quebec..... | 456,338 | 257,185 | 154,259 | 94,221 | 20,500 | 10,250 | 972,253 |
| Ontario..... | 78,823 | 297,589 | 169 | 66,885 | 427,422 | 196,208 | 639,674 |
| Manitoba..... | 224,605 | 54,575 | 62 | 49,312 | | | 328,554 |
| British Columbia..... | | | | | 74,515 | 37,258 | 37,258 |
| Total..... | 761,821 | 609,349 | 154,490 | 210,418 | 842,232 | 403,613 | 2,139,691 |

Value of Limestone Production by Provinces, 1910.

| Province. | Building and Ornamental. | Crushed. | Curbstone and Paving. | Rubble. | Furnace Flux. | | Total. |
|-----------------------|--------------------------|----------|-----------------------|---------|---------------|---------|-----------|
| | | | | | Tons. | \$ | |
| | \$ | \$ | \$ | \$ | | | \$ |
| Nova Scotia..... | | | | | 385,838 | 192,919 | 192,919 |
| New Brunswick..... | 15 | 200 | | | 100 | 100 | 315 |
| Quebec..... | 417,506 | 273,096 | 124,899 | 140,875 | 9,573 | 6,053 | 962,429 |
| Ontario..... | 62,830 | 368,911 | 738 | 100,991 | 406,394 | 189,293 | 722,763 |
| Manitoba..... | 215,378 | 59,349 | | 53,302 | | | 328,029 |
| British Columbia..... | | | | | 94,772 | 43,121 | 43,121 |
| Total..... | 695,729 | 701,556 | 125,637 | 295,168 | 896,677 | 431,486 | 2,249,576 |

The Province of Quebec was the largest producer of limestone, having a total output valued at \$962,429: of which \$417,506 was building and ornamental stone; \$273,096 crushed stone; \$140,875 in rubble; \$124,899 curbstone and paving, and \$6,053 furnace flux.

The production of all classes was slightly less than that reported for 1909. The record is probably an underestimate as there are one or two large firms that neglected to make returns, while there is a class of small operators from whom it is particularly difficult to obtain satisfactory information. In many cases they do not seem to have kept any record of their shipments. Ontario shows an increased production of limestone, the value of output in 1910 being \$722,763: of which \$368,911 was crushed stone; \$189,293 flux; \$100,991 rubble, and \$62,830 building stone. The production in Manitoba was valued at \$328,029, and consists chiefly of building stone with some crushed stone and rubble. The production of limestone in Nova Scotia and British Columbia was used entirely for furnace flux.

MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only \$4,167 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production. But the opening up of the quarries at Philipsburg, Que., by the Missisquoi Marble Company, Limited, together with the development of quarries in Ontario and British Columbia, has resulted in a considerable production of marble during the past three years. The total value of the production in 1910 was returned as \$158,779, as compared with \$158,441 in 1909 and \$125,000 in 1908. As already shown in a previous table the imports of marble during 1910 were valued at \$267,215, and in 1909, \$182,147. Marble quarries were operated during 1910 at Philipsburg, Que., Darling and Hungerford townships in Ontario, and Marblehead, British Columbia.

The value of the Quebec production was \$151,000, as compared with \$130,000 in 1909; Ontario \$4,100 as against \$3,441 in 1909; and British Columbia \$3,679 as compared with \$25,000 in 1909. With the exception of the Philipsburg quarries the operations were practically confined to the development of quarries.

Annual Production of Marble.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|-----------------------------|-------|---------|
| | | \$ | | | \$ |
| 1886..... | 501 | 9,900 | 1893..... | 590 | 5,100 |
| 1887..... | 242 | 6,224 | 1894..... | Nil | Nil |
| 1888..... | 191 | 3,100 | 1895..... | 200 | 2,000 |
| 1889..... | 43 | 980 | 1896..... | 224 | 2,405 |
| 1890..... | 780 | 10,776 | 1897 to 1907 inclusive..... | Nil | Nil |
| 1891..... | 240 | 1,752 | 1908..... | | 125,000 |
| 1892..... | 340 | 3,600 | 1909..... | | 158,441 |
| | | | 1910..... | | 158,779 |

SANDSTONE.

There was a considerable increase in the production of sandstone in 1910, the value of output being \$502,148, as compared with \$374,179 in 1909. The greater part of the sandstone quarried is used for building purposes. A small quantity is used as rubble and as crushed stone, while in Ontario sandstone paving blocks are made.

Of the production in 1910 building and ornamental sandstone was sold to the value of \$454,220, or 90.5 per cent of the total sandstone sales. This amount comprised \$118,364 in value of rough stone and \$335,856 in dressed stone as sold by the quarry operators. The production in 1909 of building and ornamental stone was valued at \$326,206, comprising \$103,859 in rough stone and \$222,347 in dressed stone.

Statistics of production in 1909 and 1910 are shown in the next two tables. There is no complete record of the sandstone production throughout Canada in previous years.

Value of Sandstone Production by Provinces, 1910.

| Province. | Building and Ornamental. | Crushed. | Paving. | Rubble. | Total. |
|-----------------------|--------------------------|----------|---------|---------|---------|
| | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 16,075 | 350 | ..... | ..... | 16,425 |
| New Brunswick..... | 49,032 | ..... | ..... | 2,761 | 51,793 |
| Ontario..... | 25,301 | 1,370 | 34,530 | 1,046 | 62,247 |
| Alberta..... | 234,437 | ..... | ..... | 6,371 | 240,858 |
| British Columbia..... | 129,325 | 1,500 | ..... | ..... | 130,825 |
| Total..... | 454,220 | 3,220 | 34,530 | 10,178 | 502,148 |

Value of Sandstone Production by Provinces, 1909.

| Province. | Building and Ornamental. | Crushed. | Paving. | Rubble. | Total. |
|-----------------------|--------------------------|----------|---------|---------|---------|
| | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 15,050 | 800 | ..... | 6,000 | 21,850 |
| New Brunswick..... | 25,784 | ..... | ..... | 4,825 | 30,609 |
| Ontario..... | 29,534 | 2,563 | 17,774 | 12,903 | 62,824 |
| Alberta..... | 87,450 | ..... | ..... | 2,933 | 90,383 |
| British Columbia..... | 168,338 | ..... | ..... | 175 | 168,513 |
| Total..... | 326,206 | 3,363 | 17,774 | 6,836 | 374,179 |